Capitol at Washington, D. C. Where the Seventieth Congress Convened on Dec. 5, 1927

Will This Congress Help or Ruin Our Merchant Marine Prospects?

By Lynne M. Lamm

IN SPITE of the fact that President Coolidge as well as many senators and representatives are very anxious for some solution of the merchant marine question, it seems very doubtful, if this, the seventieth congress, will enact any legislation into law. This is due entirely to the divergent views held by the key men.

President Coolidge, as is so well known, is anxious to have the merchant marine back in private hands, and to take the government out of this, along with all other business. On the other hand, Senator Wesley Jones of Washington, chairman of the committee on commerce of the upper house, which has charge of all shipping legislation, is evidently convinced that in order to have any American merchant marine the government must take a hand, at least for the present. He is backed in his attitude by Senator Fletcher of Florida, a democrat, who has given much attention for years to the shipping question. This attitude is opposed by Senator Edge of New Jersey.

On the house side Wallace H. White Jr., congressman from Maine, who is the new chairman of the house committee on merchant marine and fisheries, and who was the chairman of the sub-committee which went into the question of the shipping board so thoroughly a couple of years or so ago, is basically for ship subsidy. Representative Wood of Indiana, another member of the house who has given much attention to shipping, is also of the opinion held by the President. There is no question but what the merchant marine problem is going to come in for much discussion at the present session and it is possible that a bill may pass one of the houses of congress but, as stated above, doubtful if it can become law, due to the very decided views held on the subject by the President. It is believed that if any bill is passed by the congress which in any way resembles the Jones bill already introduced, that it will be vetoed by the President.

"The United States government fleet," said President Coolidge, in his annual message at the convening of the seventieth congress, "is transporting a large amount of freight and reducing its drain on the treasury. The shipping board is constantly under pressure, to which it too often yields, to protect private interests, rather than service to the public welfare." Continuing,

SENATOR WESLEY L. JONES—CHAIRMAN OF THE COMMITTEE ON COMMERCE

"More attention should be given to merchant ships as an auxiliary of the navy. The possibility of including their masters and crews in the naval reserve, with some reasonable compensation, should be thoroughly explored as a method of encouraging private operation of shipping. Public operation is not a success. No investigation, of which I have caused several to be made, has failed to report that it could not succeed or to recommend speedy transfer to private ownership. Our exporters and importers are both indifferent about using American ships. It should be our policy to keep our present vessels in repair and dispose of them as rapidly as possible, rather than undertake any new construction. Their operation is a burden on the national treasury, for which we are not receiving sufficient benefits."

This is simply a reiteration of what the President has said many times before as to his attitude on the merchant marine problem. His view, however, is not shared at all by Senator Jones. The latter has introduced two bills dealing with the question of the merchant marine in this session so far.

One was the bill to develop an American merchant marine. This was the same bill which he introduced last February and confirms the policy of the Jones act of 1920 to maintain a permanent merchant marine. According to its terms the shipping board shall not sell any vessel or line of vessels when in its judgment the building up and maintenance of an adequate merchant marine can be served best by government ownership. The board may recondition and improve the United States vessels and those in the possession or under the control of the United States for use in the foreign trade.

Replacements Are Necessary

Section 4 of this bill recognizes the necessity for replacement of United States vessels now in the possession or under the control of the board and the construction of additional vessels of various kinds to give the United States an adequate merchant marine and the board is authorized to recommend to congress what new vessels are required. All vessels are to be built in the United States. No vessel constructed under the terms of the bill can be sold without the consent of congress. This bill was favorably reported to the senate by the committee on commerce at the last session of congress.

Another bill introduced by Senator Jones is one providing for private ownership of vessels operated in the foreign trade. Contracts will be entered into with the owners of these vessels documented under the laws of the United States by which compensation will be granted to ten-knot vessels at $4 per gross ton per year; from ten to twelve knots $5; from twelve to fourteen, $8; from fourteen to fifteen, $9; fifteen to sixteen, $10; sixteen to seventeen, $11; and those vessels having a speed in excess of seventeen knots, compensation at $11 per gross ton and an additional sum per year equal to 25 cents per gross ton multiplied by the number of knots speed the vessel has in excess of seventeen knots. This compensation is given only when the vessel is operated in the foreign trade. The contracts may be for any period of time not exceeding twenty years, but are terminated when the vessel is twenty years old. One-half of the deck and engine crew shall be United States citizens. The provisions of the bill apply to trips between the United States and the Philippines until the coastwise laws are extended to this trade.

"Our people are lacking in one thing that is not pressed enough," said Senator Jones, in an interview on the subject with the writer. "We are not ship minded."

Continuing he said:

"The people of our chief shipping competitor know the vital need of

Photo by Harris & Ewing

CONGRESSMAN WALLACE H. WHITE JR.

The author of this article, Lynne M. Lamm, is Washington correspondent for MARINE REVIEW.

ships and are willing to make such personal sacrifice as may be necessary to have a merchant marine. They insist that the goods they import must be carried in the ships of their own flag and they see to it that the goods they export are carried in their ships. When our people get to the point where they follow this course, the problem of our merchant marine will be largely solved. We import and export billions of products. Of our overseas exports and imports our ships carry only about 24.89 per cent, and this is growing less year by year. If even 50 per cent of our imports and exports were carried in our ships, it would insure us a merchant marine reasonably adequate for our commerce and national security.

"Our business interests have been almost wholly dependent on foreign shipping for many years. They very naturally hesitate to forsake those who have been serving them so long. They cannot be blamed for not doing so until they can be sure of adequate shipping facilities. While American patronage of American shipping is essential to its success, assurance of sure, adequate and permanent American shipping is also essential, and so we come to the question, How can we get and assure that service?"

Senator Jones says that he is convinced that congress will not provide the aid necessary to induce private capital and enterprise to go into the shipping business and give us the merchant marine we should have. Assuming that to be true, he said, there is only one other way to get a merchant marine, and that is directly through the government.

"No people ever had brought home to them so clearly," said Senator Jones, "the need of a merchant marine as the people of the United States, and no people have ever appeared so heedless of the lesson as they. This may be a harsh statement, but it is a mild one in the face of the circumstances. When our battleship fleet was taken around the world under the administration of Theodore Roosevelt, it had to be accompanied by foreign-built ships under a foreign flag in order to have the fuel and supplies necessary to keep it going. That situation was a most humiliating one. It should have aroused our people to our need, but it did not. We went on careless and indifferent. Few and fewer ships flew the American flag. More and more did our commerce depend upon foreign shipping."

The enactment of his bill, Senator Jones declares, will be more than a declaration by the American people that they propose to establish themselves upon the seas, there to remain permanently—it will be a day to day demonstration of that purpose.

He believes that it will encourage American shippers to employ American ships, that it will stimulate more and more Americans to become ship minded and it should be a constant stimulus to the more rapid expansion of our foreign trade.

Senator Jones says also that it will mean the permanency of an adequate merchant marine in foreign trade, and will help make the United States strong upon the seas, where too long it has been weak. He thinks also that it will be a constant stimulus to private citizens to enter into the business of operating American ships in foreign trade and he says, "through this act will be restored the rank of the United States among the sea powers of the world that it once held and to which it is entitled."

Representative White, the new chairman of the house committee on merchant marine and fisheries, and a member of that committee for the past ten years, ever since he has been in congress, is now working on some merchant marine legislation, about which he is not yet ready to speak.

"If the American people are not willing openly to offset the differentials against the American ship by cash payments to the operator, then but two alternatives remain," said Mr. White to the writer in 1925 when he completed his report on his investigation of the shipping board and shipping conditions. Discussing these two ways in more detail at that time he said:

"We may continue governmental operations. Should congress conclude that this is the desire of the American people, then it should definitely declare its purpose to maintain our services substantially as they now exist and should authorize a replacement program for the fleet. If the congress and the country are not ready to adopt and to aggressively support one or the other of the foregoing courses, then in my opinion we face in a few short years the disappearance of the American ship from the seas and dependence upon foreign nations for our transportation. The material interests of our country and national pride should make our abandonment of the seas unthinkable to every American." Mr. White favors ship subsidy and in this connection said:

Foreign Governments Aid Shipping

"I do not need to assert that the aid paid by foreign governments is responsible for the growth and continued operation of their fleets. Notwithstanding many economic factors in their favor every government having a merchant marine, except our own, has deemed it necessary, and to their nation's advantage, substantially to aid by direct and indirect payments, their merchant vessels. I believe this direct aid by our government is essential to assure permanent and profitable private operation of American ships in competition with the vessels of the world. I favor this policy as the only one promising this result."

Representative Wood of Indiana, who is chairman of the sub-committee of the appropriations committee of the house which deals with the shipping board appropriations and who has studied the shipping situation for years has introduced a bill, "to promote and encourage an American merchant marine." He has just recently returned from studying shipping conditions in Europe as chairman of a sub-committee of the house.

The Wood bill contains no radical suggestions, and in the main does but three things. It proposes to re-

(*Continued on Page* 50)

What the President Said on Merchant Marine

To National Committee, Dec. 7

"Waterways and harbors, however, are useless without ships. Our government operation of our merchant marine has been helpful in many ways but it is far lacking of complete success. It would be much cheaper and far more beneficial to get it into private hands under some system of government support which would enable it to meet the lower costs of building and lower rates of wages of foreign shipping.

"We also have our navy to maintain. Within a few years replacement of capital ships must begin. We should consider at once a moderate building program for cruisers and submarines.

"Our aviation system will need more airplane carriers and our destroyer fleet will require additions of the leader type. Such a program will extend over a considerable period of years. It does not involve us in any competition with other countries, but will simply provide us with a defensive navy."

S. S. California to Have Sea Trials Soon

Arrangements have been completed by the Newport News Shipbuilding & Drydock Co. for holding the builder's trials of the new turbo-electric Panama Pacific liner CALIFORNIA on Jan. 7, off the Virginia capes.

Dock tests already made of the CALIFORNIA'S generating machinery, which is expected to deliver energy equivalent to 17,000 horsepower to her twin driving motors, have proven highly satisfactory, the generators having shown that they will develop energy far in excess of any service requirements of the motors.

The first sea trial is expected to develop exactly what the ship's driving machinery as a whole will do under varied conditions. Engineers and other technical specialists from the General Electric Co., makers of the machinery, and the International Mercantile Marine Co. as well as of the builder, will make the trial trip as observers. Capt. Roger Williams, operating manager, will head the owner's representatives.

Plans for the trial call for leaving the yard at daylight. The ship will proceed to a point off Cape Henry, where she will be sent away for a continuous run over a 16-mile measured course to False Cape, and return, using only one of her two sets of generators. She will next be given a similar test as to distance, with both sets functioning.

After maneuvering and backing tests, and the standardization of magnetic compasses, she will return to the yard at the end of the day.

In the course of the trials the ship will be steered at times by the electric steerer, or "metal mike", the nearest approach to the Robot of imagination, or mechanical man, that has yet entered the industrial world.

The builder's further program for the CALIFORNIA calls for her formal trial trip and delivery to her owners on Jan. 15. As the equipment of galleys and dining rooms will not be complete on that date, the usual entertainment feature will be omitted.

On delivery, the ship will proceed to New York, where installation of fittings, furniture and mural decorations will be completed at Pier 61, North river. She is scheduled to sail from New York Jan. 28 on her first voyage to California ports via Havana and the Panama canal. She will go out with every cabin taken. She has capacity for 751 passengers.

Index for 1927

The index for the year 1927 *covering all of the valuable editorial material which appeared in* MARINE REVIEW *last year is now ready for distribution. Copies will be sent on request, without charge, to those subscribers who have kept a complete file of copies and desire the index for reference.*

Honor Carl D. Bradley At Annual Dinner

On Dec. 13, an interesting dinner was held at the Hotel Fort Shelby, Detroit, mainly in honor of one of the most progressive and well thought of Great Lakes vessel operators, Carl D. Bradley, president of the Bradley Transportation Co. The dinner followed a two-day business session which brought together the operating men of the steamship company and of the limestone company. The culminating point of the dinner was the presentation to Mr. Bradley of a model of the latest, largest and most modern self-unloader, the new electric drive steamer, CARL D. BRADLEY. This vessel was launched April 9, 1927 and made her maiden trip on July 26, arriving in Calcite July 28.

The model was purchased by subscriptions initiated by the licensed officers of the Bradley fleet and by many other friends of Mr. Bradley. It was constructed by B. E. Foster, of the American Ship Building Co., Cleveland. Work on the model commenced in July 1927, and it was complete early in December. It is built to a scale of three thirty-seconds of an inch to the foot and is therefore, 5 feet long and of width in proportion. Excellent workmanship has gone into the making of this model and it is complete to almost the last detail. The presentation was a complete surprise to Mr. Bradley. The address of presentation was made by F. L. Leckie, admiralty lawyer, Cleveland.

Port of Basle on Rhine Handles Record Cargo

The Rhine Harbor at Basle, Switzerland

TRAFFIC on the upper Rhine, as shown by records of cargo at Basle, Switzerland, is steadily growing. The Anglo-Swiss Commercial Gazette for July, 1927, *said: The month of June brought still another record for this year in the total tonnage handled at the port of Basle. The May total of* 96,190 *tons was increased to* 103,314 *tons, of which* 81,927 *tons came up the open river. For January-June of this year the total tonnage registered was* 273,891 *as against only* 113,079 *in the same period during* 1926.

Bird's-Eye View of Plant of Bath Iron Works Corp., at Bath, Me.

Famous Maine Shipyard Reopens

Bath Iron Works After Two-year Shut Down Again Resumes Steel Shipbuilding—New Equipment Increases Plant Efficiency

IN HIS recent presidential address before the Society of Naval Architects and Marine Engineers, Admiral Taylor said with reference to the Bath Iron Works, "Nowhere were better destroyers built than at Bath." There was a universal feeling of regret that this yard which so well proved to the world that the skill of the Yankee as a shipbuilder had not disappeared with the famous clippers of other days, should find it necessary to close. And it is of the greatest interest to learn that shipbuilding activities have again commenced at this yard.

After two years of inactivity the plant has been taken over by a new corporation headed by William S. Newell as president and general manager. The first contract has been obtained, an order for a twin screw steel yacht with diesel engines. This craft which will have an over all length of 240 feet is for Edward B. Dane of Brookline, Mass. The load water line length will be 220 feet 3 inches, molded beam 36 feet and draft, 14 feet 6 inches. The yacht is from the designs of Henry J. Gielow, Inc., New York.

The new corporation has the advantage of a superior background for engaging in a general shipbuilding business for the name and fame of the Bath Iron Works was nation wide during its 45 years of activity. In its list of 53 vessels built for the United States government are included the battleship GEORGIA, cruiser CLEVELAND, scout cruiser CHESTER, monitor NEVADA, gunboats CASTINE and MACHIAS, besides numerous torpedo boats and destroyers. The plant also was especially successful in the building of commercial and pleasure craft. Among the commercial craft of recent years are the two fine boats ISLANDER and NOBSKA for the New Bedford, Martha's Vineyard and Nantucket Steamboat Co. Both of these vessels are giving excellent service.

W. S. NEWELL
President, Bath Iron Works Corp.

Included among the pleasure craft may be mentioned the APHRODITE, built for Col. Oliver H. Payne of New York and at the time of her launching in 1899 the largest pleasure yacht ever built in this country. Her over all length was 304 feet and her displacement was 1823 tons. She was used as a patrol boat in the English channel during the World war and has recently been sold to the Greek government. Other famous yachts built at the plant include the cruiser WINCHESTER for Peter W. Rouss and now under charter to Vincent Astor; yacht ISABEL built for John N. Willys, now United States destroyer 125 at-

tached to the China station; yacht VIRGINIA built for Isaac Stern of New York and yacht PANTOOSET built for Col. A. S. Bigelow of Boston.

Much new equipment has been bought for the plant and each of the various departments is being made ready for the business which the new corporation expects to get. All the officials are optimistic over the outlook and every effort will be made to obtain work to keep the new yard busy. The keel for the Dane yacht will be laid in February and the contract calls for her delivery by July 15.

Newell Becomes President

William S. Newell, who recently resigned as general manager of the shipbuilding plant of the American Brown Boveri Electric Corp., at Camden, N. J., to become president and general manager of the Bath Iron Works Corp., is widely and favorably known in shipbuilding circles throughout the country. He was for 23 years at the Bath Iron Works, the last eight as works manager.

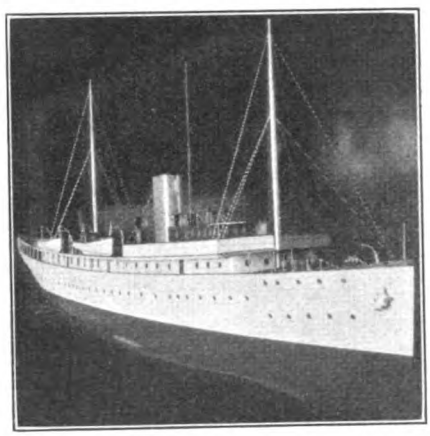
Born in Albany, N. Y., he was graduated from Massachusetts Institute of Technology in 1899 and then obtained practical knowledge by working for a time with a riveting crew, entered a machine shop, stayed for awhile in the drafting rooms and mastered engine room detail as a member of an engineering crew on a steamer in transatlantic service.

He is a member of the American Society of Naval Architects and Marine Engineers, of the Institution of Naval Architects of Great Britain, associate member of the American Society of Naval Engineers, United States Naval Institute, and of the Engineers club of New York. He is president and engineering expert of the Bath water district, is a director of the Bath Trust Co., and a trustee of the Bath Savings Institution.

Associated with Mr. Newell are Archibald M. Main and William S. Truss as vice presidents, the former as naval architect and the latter in charge of estimates and sales. Both are men of wide experience and are well known in the shipbuilding industry.

Mr. Main studied naval architecture under Professors Biles and Barr at Glasgow University and was for a time associated with G. L. Watson, the famous naval architect at the plant of the Eastern Shipbuilding Co., Groton, Conn., during the building of the great merchant vessels MINNESOTA and DAKOTA and represented the late Charles R. Hanscom during their completion and delivery. During 12 years association with Harlan & Hollingsworth Corp., Wilmington, Del., where he was successively draftsman, general superintendent and naval architect, he designed and constructed many successful vessels.

When the United States entered the war he became vice president and general manager of the Merrill Stevens Co., Jacksonville, Fla., building a new yard at South Jacksonville and constructed several composite and steel ships. Two of the latter, the ASHBEE and JACKSONVILLE, were converted from steam to diesel drive. With the signing of the armistice he returned to Groton, Conn., as naval architect and subsequently became general manager of the Groton Iron Works where he completed nine large steel ships for the United States Shipping Board. Then he returned to Wilmington, Del., to become consulting naval architect for Pusey & Jones Co., and during this period was also vice president of William Griscom Coxe Inc., naval architectes and engineers of Philadelphia. Mr. Main is a member of the Society of Naval Architects and Marine Engineers of New York and of the Institution of Naval Architects of Great Britain.



MODEL OF TWIN SCREW DIESEL YACHT TO BE BUILT BY THE BATH IRON WORKS CORP.

Mr. Truss, has varied experience and a broad knowledge of the industry. He was for 26 years associated with William Griscom Coxe Inc., a large part of this time virtually as confidential assistant to Mr. Coxe who was one of the foremost designers in the country. He went to the Harlan plant of the Bethlehem Shipbuilding Corp., at Wilmington in 1905 and was there 16 years, later going to the main office of the corporation at Bethlehem, Pa., as superintendent of marine repairs of all the east coast yards of the corporation. For the last six years he has been general manager of marine sales of Pusey & Jones Co., Wilmington, Del. He is a man of wide acquaintance, and because of his intimate knowledge of estimates and marine sales will be particular valuable to the new corporation. He is a member of the Society of Naval Architects and Marine Engineers.

To Maintain Old Standards

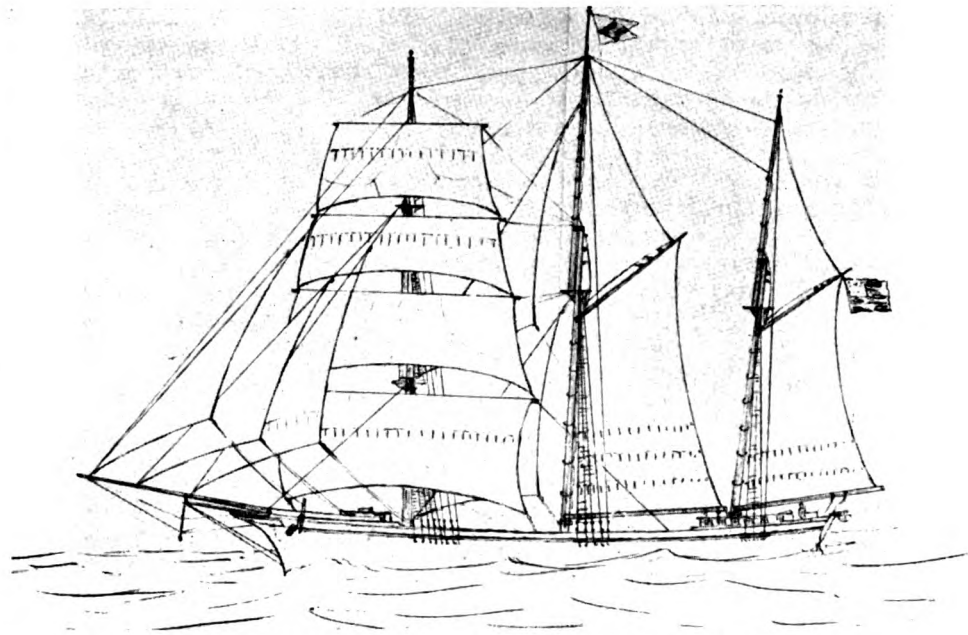
The general superintendent in charge of yard is Roland F. Hill who resigned as assistant superintendent of machinery at the North yard of American Brown Boveri Electric Corp., Camden, N. J., to go to the Bath plant.

Mr. Hill is a native of Bath, Maine, and was educated in its public schools and at Hobart college, Geneva, N. Y. His first employment was in the drawing room at the Bath Iron Works from which he went to the Lake Torpedo Boat Co., at Bridgeport, Conn., as leading draftsman at the time of building submarines for the United States navy. He was promoted to assistant to the chief engineer and assistant plant engineer. His next move was to Sharptown, Md., as general manager of Eastern Shore Shipbuilding Corp. He was general superintendent of machinery installation at the American International Corp., Hog Island, Pa., during the war; later he became superintendent of machinery, South yard, of the New York Shipbuilding Corp., manager of the marine department of Pusey & Jones Co., superintending constructor and engineer in charge of building the immense station of the Gulf Refining Co., at Girard Point, Philadelphia. He is a member of the Society of Naval Architects and Marine Engineers.

L. Eugene Thebeau of Bath, Me. is treasurer of the new corporation. Mr. Thebeau was for 24 years with the Maine Central Railroad Co., the last 16 as general agent at Bath. He is prominent in fiancial circles having been a trustee of the Bath Trust Co., 15 years and secretary of the institution the last ten years.

Electrical Machinery

Gibbs Bros. Inc., naval architects, New York, acting for the shipping board has awarded a contract to the General Electric Co. to furnish the electrical equipment for the conversion of the freighter, COURAGEOUS, one of three to be made over from steam to diesel electric drive. The other two vessels are the TRIUMPH and DEFIANCE. All three vessels are now equipped with geared turbines. Conversion work on the COURAGEOUS will be carried out by the Federal Shipbuilding Co., the TRIUMPH will be done by the Boston navy yard and the DEFIANCE by the Norfolk navy yard.



Sail Plan of Barkentine James F. Joy—Drawn by Richard P. Joy

Record of a Great Lakes Sailing Vessel

By Richard P. Joy

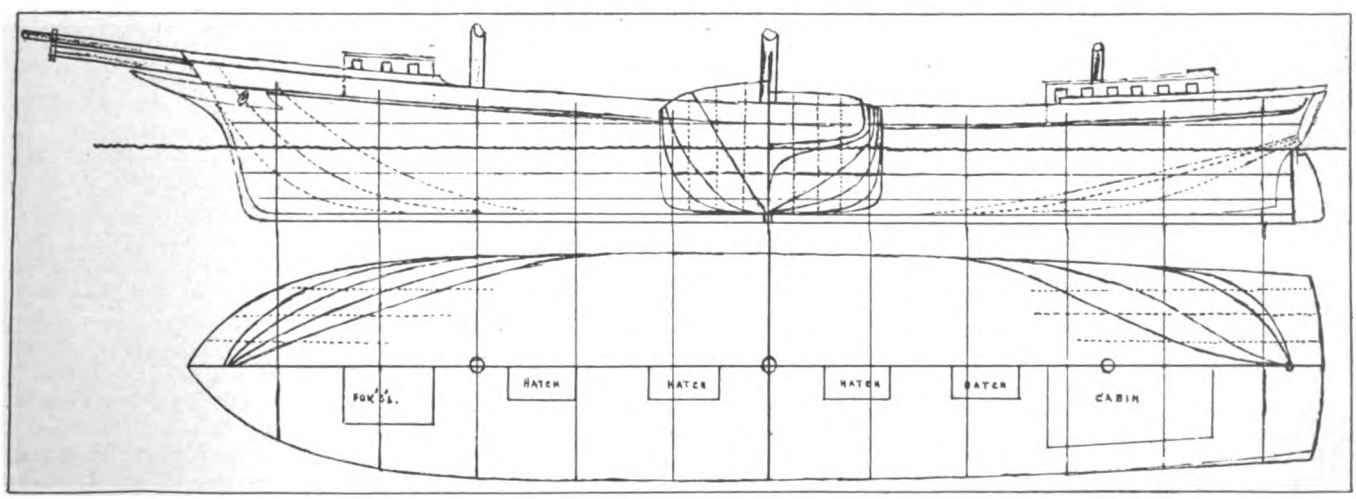
THE barkentine, JAMES F. JOY, was owned by George W. Bissel of Detroit, and was launched in 1866, from a shipyard located at or near what is now the foot of Twelfth street. The vessel was 175 feet long from bow to stern, 35 feet beam and 13 feet molded depth and carried a cargo of 553 net tons. The ship after 21 years of honorable service foundered in a storm on Lake Erie off Ashtabula, Oct. 23, 1887. The estimated loss on the vessel was $16,000 and on the cargo of iron ore $6000. No lives were lost.

The JAMES F. JOY, was one of the largest sailing vessels on the Great Lakes when she was launched, 61 years ago. Today she would not be as large as some of the well known yachts. The large lake steamers of today carrying 15,000 tons deadweight will carry as many tons of cargo in one trip as the JAMES F. JOY would carry in twenty-six voyages. The ships of the "Sixties" were limited to 11 feet draft over the Lime Kiln crossing in the Detroit river, whereas the ship of today may load to 20 feet.

There was no more beautiful sight than a full rigged ship at sea under full sail, and the JAMES F. JOY was a comely barkentine. Men are now living who sailed on that vessel, among them Louis Brusoe, winterkeeper of The Old club at the St. Clair flats. A man had to be a real seaman in those days to go aloft and lay out on the yards to shorten or furl sail on dark and stormy nights, perhaps with the shrouds covered with ice and sleet.

It was the custom for tugs to tow sailing vessels through the rivers from Lake Erie to Lake Huron and vice versa. It was not uncommon to see six or seven and even eight full-rigged vessels being towed by the SWEEPSTAKES, CHAMPION, MOCKING BIRD, JOHN OWEN, JOHN MARTIN, GEORGE N. BRADY, JOHN PRINDEVILLE, BALIZE and other powerful tugs. When the tugs got the ships well outside in

The author of this interesting historical sketch, Richard P. Joy, is president of the National Bank of Commerce, Detroit.



Lines of the Great Lakes Barkentine James F. Joy—Drawn by Richard P. Joy

Lake Huron or Erie, they would let go their lines and soon the vessels would each be under a cloud of white canvas racing for Chicago or Buffalo or wherever they were bound.

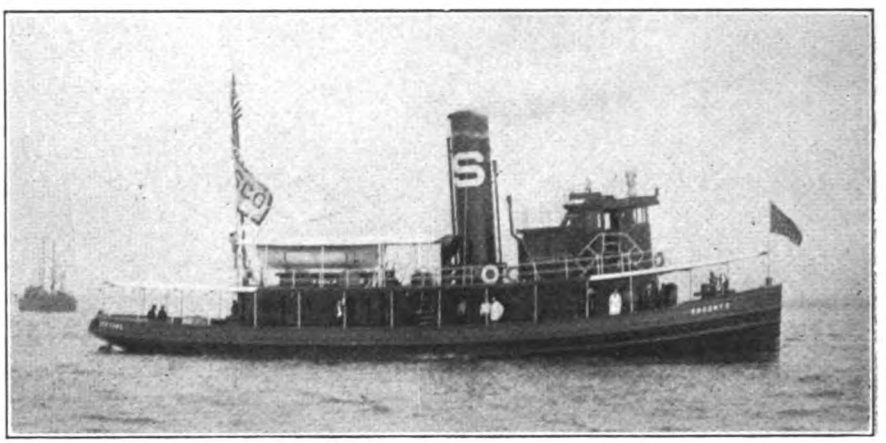
George W. Bissel was a progressive ship owner as well as a gentleman of the old school. He sent several ships from New Baltimore loaded with staves to Liverpool, England, via the Welland and St. Lawrence river canals. Some of these ships returned to the lakes while others were sold abroad. Mr. Bissel once informed the writer that he gave one of his captains permission to take his wife with him on a foreign voyage, but that when the ship passed into the rough waters of the Atlantic off Newfoundland, the captain's wife became the "admiral" and ordered the captain to return to Quebec, which he did. This forced Mr. Bissel to give orders that captains' wives must remain ashore.

Among the old square riggers were the FRANCIS PALMS, CONSTITUTION, ZACHARIAH CHANDLER, SUNSHINE, SUNRISE, DONALDSON, DAVID DOWS, a five masted barkentine, and many others that old sailormen will recall. These old ships exist now only in memory, and few records remain.

Build Harbor Tugs and Towing Barges

THE Standard Transportation Co., which owns and operates the fleet of the Standard Oil Co. of New York, had built during last year, two large towboats and two towing barges all for harbor and sound service. A brief description of this equipment is now available.

The towboats, named SOCONY I and SOCONY V are sister boats and the latter is shown in the accompanying illustration. They were designed by the Standard Transportation Co. under the direction of N. J. Pluymert. They were built by the Staten Island Shipbuilding Co. to meet all the requirements of the United States steamboat inspection service and wholly to class of American Bureau of shipping for harbor and sound service.



SOCONY5—NEW STEAM TUG FOR STANDARD TRANSPORTATION CO.

General dimensions are: Length overall, 105 feet 9 inches; length between perpendiculars, 100 feet 6 inches; beam molded, 24 feet; depth molded, 12 feet 9 inches; mean draft, light, 10 feet; mean draft loaded, 12 feet 6 inches. The average speed light is 12 miles per hour, and towing it is 7 miles per hour. The indicated horsepower, light, is 900 and the indicated horsepower towing, 750.

These tugs are built of steel with transverse framing, bar keel, steel deck and houses. There are four transverse bulkheads, two of which are oil tight and two watertight. In the fuel bunker is an oiltight center line bulkhead.

The propelling power is furnished by one vertical inverted compound, surface condensing steam engine with cylinders 18½ and 40 inches in diameter and with a stroke of 26 inches. There is an independent circulating and air pump. The condenser is of the cylindrical shell type of 1200 square feet cooling surface.

Steam is supplied by a single, three furnace, scotch marine boiler, 14 feet 9 inches in diameter and 12 feet in length overall. The three furnaces communicate with a common combustion chamber. The heating surface of the boiler is 3008.5 square feet and the grate surface is 74.7 square feet. The working pressure is 160 pounds per square inch at the gage. They are equipped for coal or oil, forced or natural draft. The oil fuel system is of the mechanical pressure atomized type.

Fuel capacity is provided for 16,750 gallons, equal to 400 barrels or 66 tons. Bunkers are located amidship. Fresh water capacity is equal to 25,980 gallons or 93 tons, including the weight of the boiler.

Each tug is equipped for fire fighting with an independent fire pump, a Monitor nozzle, hose and appropriate connections. The crew including officers for each tug is 11 men.

The steel towing barges named SOCONY 111 and SOCONY 112 are large, fully equipped vessels built to the highest standards. The designs were prepared as in the case of the towboats under the direction of Mr. Pluymert. Both barges were built by the American Ship Building Co. at its Lorain, O., plant. They were completed in the fall of 1927.

All requirements of the United States steamboat inspection service and of the American Bureau of shipping for towing barges intended for harbor and sound service are fully met in construction and equipment.

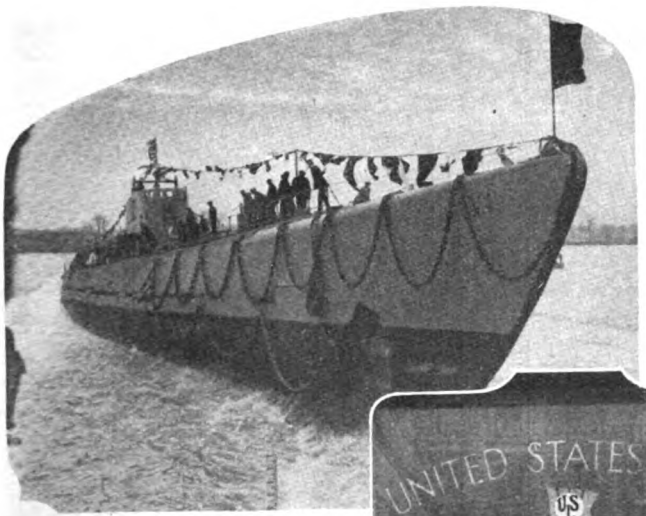
The general dimensions are: Length overall, 258 feet; beam molded, 40 feet; depth molded, 13 feet; mean draft light, 3 feet; mean draft loaded, 11 feet.

These barges are built on the transverse system of framing and there are seven oiltight transverse bulkheads. The bulkheads divide the barge into six double cargo tanks and an independent pump room and forepeak. There is an oiltight center line bulkhead through the cargo tanks. Over the cargo tanks are fitted independent expansion hatches. There is a complete steel deck and the house is of steel.

Though nonself-propelled these barges are equipped with independent steering gear, anchor windlass and electric lights. Accommodations are provided for a crew of five men including the captain.

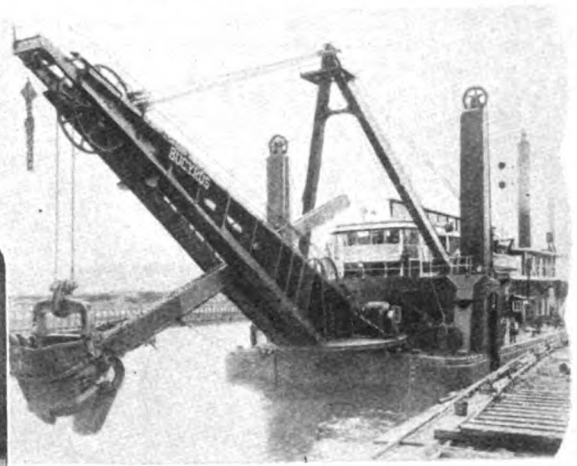
Pumping arrangements have been carefully worked out. There are two 15 x 11 x 18 inches horizontal duplex, steam driven pumps. One of these is located on deck and one in the pump room aft. Each pump has a capacity of 1500 barrels per hour. The piping consists of one eight-inch pipe with one six-inch suction forward and one four-inch suction aft each side of center bulkhead in the tanks. There is an eight-inch loading and discharge line on deck and also an independent loading line to each tank. The total capacity of each barge in the six double tanks is 750,000 gallons at 6½ pounds.

Latest Marine Events in Pictures

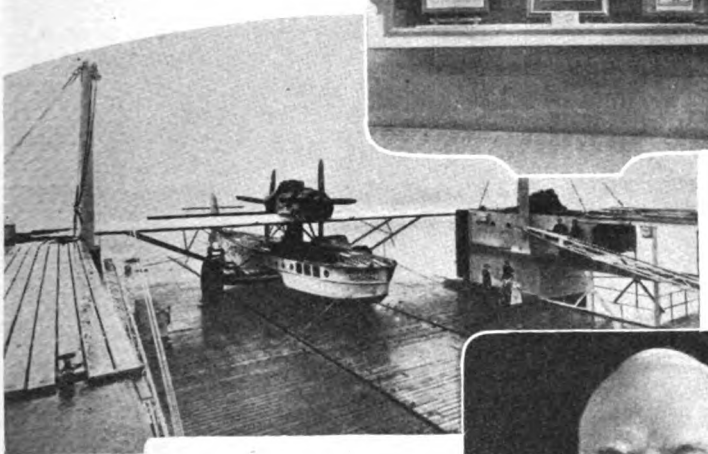


At left—Mine laying submarine U. S. S. V-4 just after launching at Portsmouth, N. H., navy yard. It is reported that she is the world's largest under sea craft. In commission she will carry eight officers and 80 men, about twice the complement of the ill-fated S-4, which was rammed and sank Dec. 17, off Provincetown, Mass., with loss of all on board.

At right—Regent street window of the United States lines' office in Dorland House, London. A creditable showing has been made in the number of passengers booked during 1927.



Above—Diesel electric, ten cubic yard, dipper dredge, Crest, built by Bucyrus Co. for the Great Lakes Dredge and Dock Co. The hull was built by the American Brown Boveri Corp., Camden, N. J.



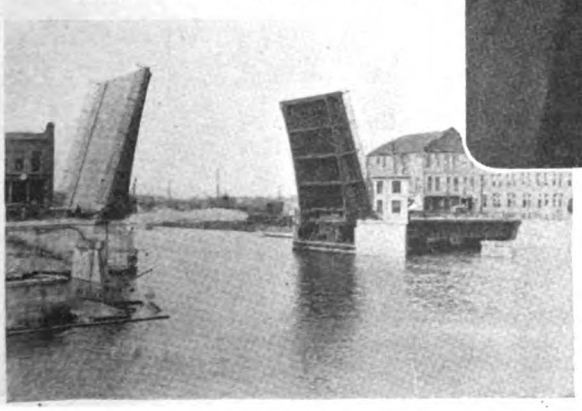
Above—New 100-ton floating dock for flying boats constructed by Luebeck Flendor Works, Germany. A Dornier Superwal plane, first arrival

Below—Highway bascule type bridge, crossing Erie canal at Webster street, Tonawanda, New York.

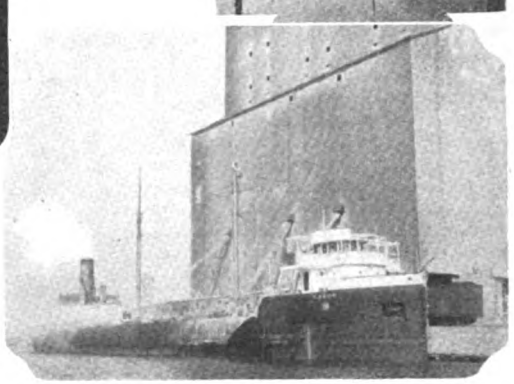
Above—Steamer Henry Cort, record ice-breaker of the Great Lakes, in drydock at the Chicago Ship Building Co., South Chicago.

Below — Package freighter Conners leaving Milwaukee Harbor for Buffalo.

Charles W. Bowring, president, Bowring Cuba Corp., New York.



At Right—British steamer Casco loading export grain at Chicago.



Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

OWNER of a tug, which delivered her to a conditional purchaser, which contracted to give bond to protect the seller against liens, but did not do so, was liable for repairs made on the order of the purchaser before it had completed payment for the tug, and which later became bankrupt.—BOISE PENROSE, 14 F. (2d) 70.

* * *

CLAIMANT in the case of EASTERN SHORE, 14 F. (2d) 82, was the owner of two steam ferryboats. During the summer both were operated, but in winter one crew was laid off and only one boat was operated at a time, sometimes one of the boats and sometimes the other. The crew was interchangeable. The court held that the crew were attached to both vessels, in such sense that its members could not recover for salvage services rendered to either.

* * *

DEMAND by a seaman for half wages, made after the master had refused to pay him off and discharge him, and he had determined to desert, as he did, is ineffective to excuse his leaving the ship or entitle him to recover wages.—HAVEN SIDE, 14 F. (2d) 851.

* * *

SALVAGE awards," it was declared in the case of NICARAO, 15 F. (2d) 73, "are primarily predicated upon a broad public policy, looking to the encouragement of bona fide rescue by volunteer persons and vessels and other marine agencies in cases of marine disaster and distress, whereby life and property may be saved." The court said further: "In the making of awards, a great responsibility is imposed upon courts of admiralty. It is as much their duty to safeguard marine property from spurious claims as it is to recognize meritorious ones. In the encouragement of bona fide salvage, due regard must be paid to the necessity for discouraging certain species of beach combing."

* * *

WHERE an owner of a ship finds himself unable to deliver her to a charterer because of the failure of another, who has had her under charter, to redeliver her as called for under his charter, it is the duty of the owner," it was said in the case of Orvig's Dampskibselskab Aktieselskab v. Munson Steamship Line, 15 F. (2d) 99, "to minimize the damages, if he intends to call upon the first charterer for damages, and it then becomes incumbent upon him to secure, at the prevailing rate, a similar ship, and deliver her to his new charterer in place of his own, which his first charterer had failed to redeliver."

* * *

THE case of FREDERICK LUCKENBACH, 15 F. (2d) 241, turned upon the construction to be given to liberty of call clauses in the bills of lading, and their application to the course taken by the vessel. The court stated that such clauses cannot be permitted to operate to the extent of their literal scope, when this would defeat the substantial purpose of the contract; they must be construed in a business sense, with the purposes of the contract always in mind, and, in the absence of express provisions, will always be construed as only permitting calls at ports or places which are properly in the course of the voyage described.

* * *

A CONTRACT for storage of grain in a vessel is one of carriage, and seaworthiness for the purpose is implied.—Eastern Grain, Mill & Elevator Corp. v. Buffalo Steamship Co., 15 F. (2d) 714.

* * *

CLAUSES in bill of lading which exempt vessel from loss or damage arising "from fault or insufficiency of packages or other insufficiently protected property * * * from drainage, leakage, breakage * * * from stowage or contact with, or smell, or evaporation, or taint, from other goods," if applicable, do not, according to the decision in the case of MILWAUKEE BRIDGE, 15 F. (2d) 249, exempt from liability for damage resulting from the unseaworthy condition of the vessel, or from negligence in the stowage, custody, and care of the cargo.

* * *

IN AWARDING salvage, the state of mind—that is, the apprehension of danger on the part of those originally in charge of the salvaged property—is a fair subject of consideration in determining the quantum of salvage.—CORNELL, 15 F. (2d) 375.

* * *

A VESSEL having violated the rules of navigation, the burden of proof is on her to justify departure therefrom by showing that it was unsafe or impracticable for her to observe them. Where it appears that if she had observed the rules, collision would not have occurred, she cannot avoid liability without showing, not merely that her fault did not contribute to the collision, but that it could not have done so.—CHARLES R. MCCORMICK, 15 F. (2d) 386.

* * *

PROPERTY values properly considered in fixing the amount of a salvage award are the actual values of the property saved and of the instrumentalities used in effecting the saving. It was therefore decided, in the case of Savannah Sugar Refining Corp. v. Atlantic Towing Co., 15 F. (2d) 649, that an award of $15,000 and interest for services rendered a stranded vessel valued at $100,000, carrying freight and cargo valued at over $300,000, by tugs valued at $250,000, was not excessive.

* * *

BY GENERAL maritime law and usage the seaman is bound to the vessel for the voyage for which he signs articles, and the vessel is bound to retain the seaman unless his own good (as in the case of his serious illness, where skilled medical attention is necessary for him), or the safety of the vessel (as where he is violently mutinous and likely to be a source of uncontrollable trouble and danger, if retained on board), justify putting him ashore in a foreign port. Incompetence to perform the duties of an important position in which he has shipped, and which for the safety of the vessel must be capably filled, would also justify his discharge abroad. These are questions for the master to decide; he is the one who makes the discharge.—McAvey v. Emergency Fleet Corp., 15 F. (2d) 405.

* * *

FREIGHT money of cargoes, it was held in the case of TOURIST, 16 F. (2d) 155, may be pledged or hypothecated for advances to assist consummation of the trip and for running other boats; the advances were made for maritime purposes. The court further decided that the claim of a shipper against a navigation company for fault of a barge in tow carrying one shipment cannot be set off or counterclaimed against freight money owing by the same shipper for a shipment on other fleet of barges, as the asserted set-off or counterclaim did not arise out of the same transaction or contract; nor did the bankruptcy of the said navigation company raise an exception to the rule.

* * *

WHEN ship A is in a collision with ship B, owing to the fault of both parties, and the cargo owners on B are entitled to recover against A, though not against B, the owners of A may recoup against B the proper share of what they had to pay to the cargo owners. The word 'recoup' is significant and controlling, for the whole theory of any recovery against anybody by the cargo owners on B rests on a direct liability existing on the part of ship A or its owners to said cargo owners."—Petition of United States Steel Products Co., 16 F. (2d) 306.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	543	2,243,752	474	2,069,106
October	485	2,105,364	531	2,221,372
September	498	2,158,701	565	2,428,200
August	522	2,179,068	551	2,287,367
July	478	1,910,229	553	2,258,495
June	498	2,093,540	566	2,334,128
May	525	2,167,154	539	2,179,208
April	487	2,048,786	565	2,353,404
March	460	1,936,478	515	2,074,694
February, 1927	408	1,679,912	468	1,962,365

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	78	193,676	43	99,965
October	94	211,988	63	136,871
September	77	183,481	50	95,898
August	99	235,657	70	153,305
July	83	186,182	53	110,614
June	95	213,122	66	180,861
May	88	196,606	47	86,214
April	86	194,135	52	123,179
March	96	223,255	58	131,147
February, 1927	81	190,536	48	126,619

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	98	320,340	63	178,707
October	107	380,655	69	244,265
September	114	375,509	83	243,244
August	149	441,819	96	285,255
July	147	401,008	103	326,695
June	155	344,548	99	242,957
May	130	318,196	100	262,982
April	120	343,388	72	201,868
March	95	301,413	59	187,556
February, 1927	83	277,063	40	119,246

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	25	42,291	26	40,248
October	32	60,920	35	71,587
September	32	68,688	32	61,227
August	33	61,873	32	58,949
July	37	62,890	35	55,144
June	24	31,714	25	34,855
May	24	38,244	22	37,246
April	21	37,182	21	37,114
March, 1927	23	63,195	27	73,944

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	4	16,374	2	9,920
October	7	24,736	1	2,875
September	4	12,240	4	14,109
August	5	27,235	1	4,035
July	11	37,384	5	17,628
June	3	12,559	5	15,930
May	9	36,882	6	25,950
April	7	28,776	5	18,903
March	7	26,065	7	25,780
February, 1927	3	10,380	6	23,696

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	38	141,747	70	247,571
October	57	208,738	70	254,270
September	59	211,182	79	291,920
August	32	117,116	47	157,715
July	31	110,966	35	119,824
June,	24	91,554	33	118,631
May	24	86,618	28	98,277
April	31	120,431	44	169,247
March	21	78,379	31	106,768
February, 1927	15	63,320	28	106,356

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	103	330,488	110	323,666
October	118	365,876	116	350,509
September	116	355,924	130	402,528
August	131	390,713	138	408,083
July	128	384,450	130	368,096
June,	125	375,204	125	376,019
May	112	333,395	117	340,274
April	131	409,145	127	377,039
March	120	355,162	117	328,893
February, 1927	100	308,501	95	301,401

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	23	51,726	78	206,978
October	25	65,640	77	214,940
September	26	67,249	87	240,899
August	32	71,356	92	222,502
July	42	112,442	77	201,882
June	34	61,041	82	190,228
May	27	56,458	70	179,658
April	23	54,983	77	209,869
March	32	87,970	98	264,863
February, 1927	31	88,928	77	232,403

Savannah

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1927	41	119,953	39	112,138
September	36	108,866	40	118,431
August	30	90,063	30	93,030
July	33	96,525	30	87,055
June	27	67,095	30	75,193
May	37	103,549	37	102,757
April	30	87,296	26	108,150
March	37	102,732	39	114,871
February	41	106,385	40	101,633
January, 1927	29	34,029	32	91,974

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	112	92,152	107	89,156
October	80	87,814	83	88,587
September	69	86,793	72	88,480
August	72	81,247	70	84,132
July	78	84,790	79	84,186
June	84	97,585	85	97,535
May	105	113,030	106	115,564
April	78	79,818	74	75,913
March	80	91,602	75	93,700
February, 1927	90	101,179	84	102,571

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	75	161,528	79	176,885
October	89	210,973	97	237,282
September	80	172,518	89	195,714
August	92	194,609	84	184,655
July	94	198,668	89	190,965
June,	97	206,410	84	165,649
May	114	237,650	103	205,876
April	107	240,273	108	218,246
March	107	217,848	98	197,395
February, 1927	99	249,158	86	190,907

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	59	231,003	68	264,841
October	68	268,666	69	272,875
September	62	233,554	58	227,096
August	109	218,218	102	203,902
July	45	183,023	40	162,121
June	38	159,687	39	162,632
May	41	177,869	42	169,083
April	46	186,581	49	185,593
March	39	159,034	44	175,937
February, 1927	40	170,776	45	195,692

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	226	586,013	236	609,299
October	260	693,720	265	710,922
September	232	613,772	240	632,593
August	276	797,128	265	672,392
July	250	615,826	241	580,228
June	248	606,501	267	750,937
May	277	640,252	269	627,452
April	262	642,846	268	664,467
March	276	712,619	278	695,933
February, 1927	240	632,092	249	628,762

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	32	77,911	33	81,978
October	37	95,473	36	95,070
September	39	102,374	39	101,044
August	39	108,022	35	92,227
July	19	41,460	20	44,633
June	25	67,366	24	62,132
May	26	79,855	24	63,862
April	23	60,557	26	63,555
March	28	84,155	31	85,476
February, 1927	27	81,829	33	158,088

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1927	69	184,154	99	290,370
September	70	200,573	97	301,105
August	76	214,876	95	274,670
July	77	204,961	93	260,431
June	67	173,331	75	199,410
May	80	218,443	101	281,221
April	63	179,757	88	265,159
March	84	247,873	98	307,155
February	43	114,628	82	248,364
January, 1927	47	146,318	97	318,609

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1927	266	573,090	202	489,442
September	238	488,416	282	441,134
August	160	483,069	214	473,702
July	121	452,983	106	407,695
June	178	484,561	125	418,967
May	161	470,471	138	456,885
April	179	477,762	173	441,374
March	156	451,428	165	442,022
February	144	418,190	144	404,753
January	137	420,426	138	381,692
December, 1926	155	438,464	123	386,004

San Francisco

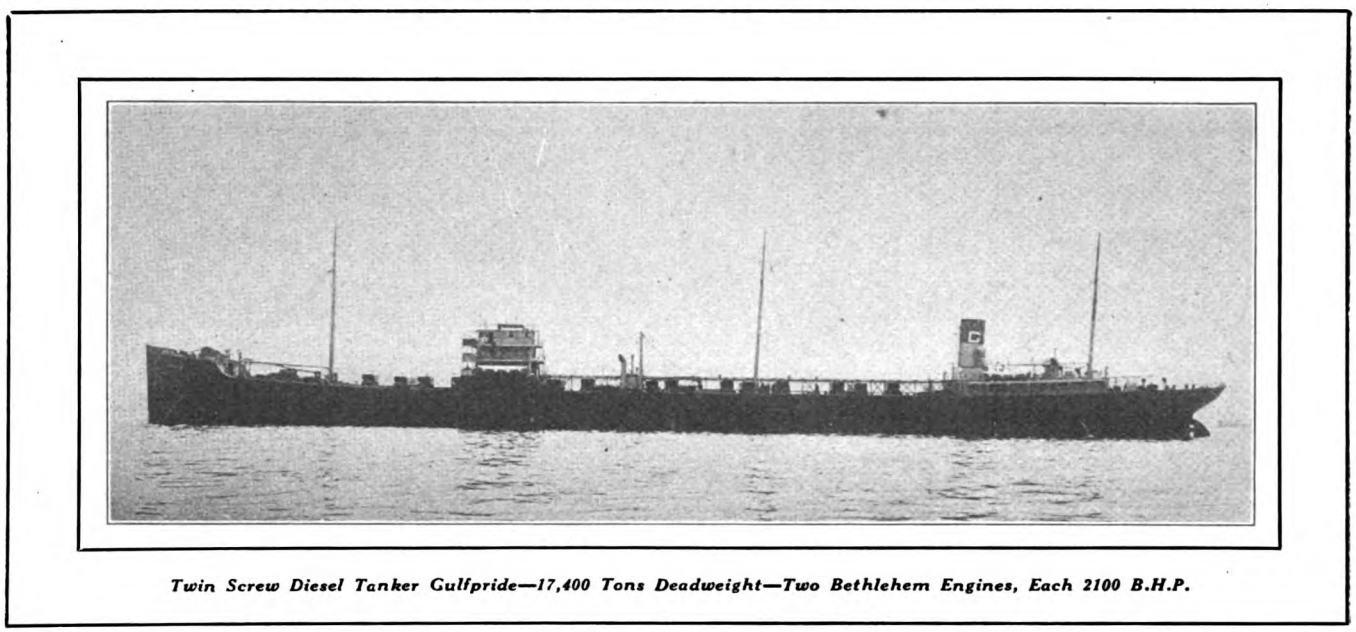
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1927..	139	538,160	135	578,466
October	173	630,193	162	607,386
September	168	600,454	152	559,684
August	176	636,152	150	583,653
June	154	556,225	140	526,976
May	148	545,414	137	510,560
April	141	531,380	137	518,577
March	145	555,324	148	586,354
February	147	561,214	138	513,253
January, 1927	133	497,560	141	522,806

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1927	18	50,632	25	82,177
September	16	51,492	29	83,728
August	22	58,352	27	78,652
July	21	61,871	34	102,998
June	16	44,565	26	92,198
May	15	46,223	28	83,926
April	26	57,645	40	107,757
March	20	47,739	23	58,802
February	34	80,063	31	84,324
January	22	57,644	28	84,531
December, 1926	25	72,885	31	100,184



Twin Screw Diesel Tanker Gulfpride—17,400 Tons Deadweight—Two Bethlehem Engines, Each 2100 B.H.P.

Use Proper Control Equipment

Electric Auxiliaries Find Favor on Steam and Diesel Ships—Dependable Control Mechanism Will Eliminate Trouble and Increase Efficiency

BY E. G. PETERSON

ELECTRIC drive for the auxiliaries is the answer to the question, "What about the auxiliaries?" on a diesel or diesel electric ship. Electricity is more efficient than steam for driving the anchor windlass, various winches, pumps, ventilating fans, etc. Cold weather does not interfere with the operation of electrically-driven machinery. The electric motor cannot freeze up, and the colder the weather the more efficiently the motor operates. There is no power loss from leaking pipe joints, nor from heat lost by conduction to the atmosphere. The electric motor develops its power by rotation directly at the motor shaft, has fewer parts, and is a simpler machine than a steam engine which develops its power by a reciprocating stroke and requires a crank to produce rotation.

The operating characteristics of an electric motor are entirely different from those of a steam engine, but by using the proper electrical controller any required result can be obtained. Dependable motor and control equipment is obtainable that will operate successfully with a minimum of attention and maintenance. A brief description of the electrically-driven auxiliaries on the new tanker GULFPRIDE, the world's largest tanker motorship will serve to illustrate these statements.

The author, E. G. Peterson, is connected with the Cutler-Hammer Mfg. Co. This article was prepared at the request of the editor.

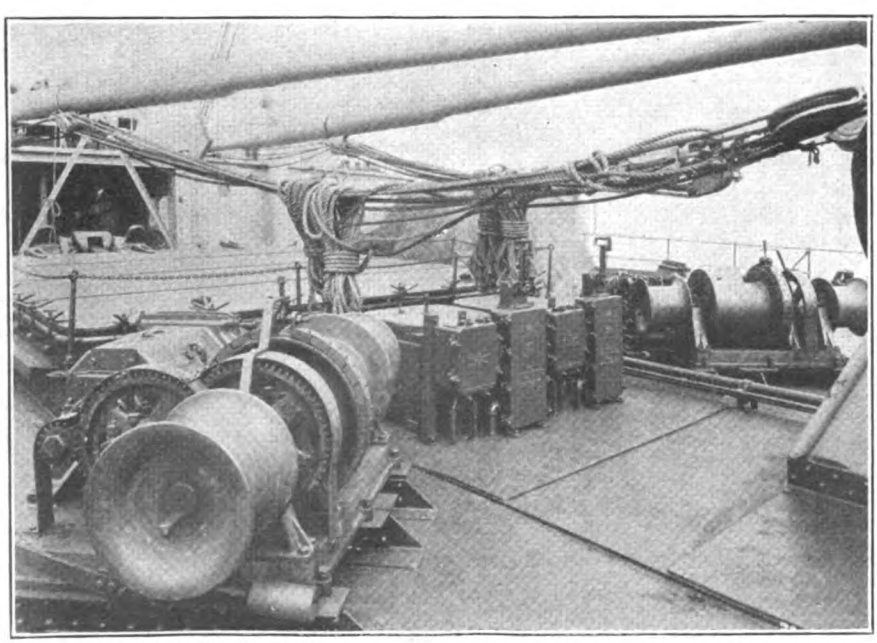


FIG. 1—CARGO WINCHES WITH SOLENOID SHOE BRAKES—CONTROLLERS IN CENTER M. S. GULFPRIDE

Electric Cargo Winch Controls

The two cargo winches shown in Fig. 1 each have a single drum with spur gear drive, foot operated band brake and two gypsy heads. A Westinghouse 27 horsepower reversible, watertight marine insulated, compound wound motor drives the single drum through a double spur gear reduction. A Cutler-Hammer watertight solenoid operated shoe brake having woven asbestos linings is mounted on the commutator end of the motor and serves to stop the motor and load. It prevents unreeling of the line when the controller handle is returned to the "off" position with a load supported on the hook. Fig 2 shows a similar brake used on the anchor windlass.

The controllers are mounted in a

group on the deck between the two winches so that the operator has a complete view of both winches and of the hold and can readily operate either winch. Each controller includes a watertight drum type controller, a watertight protective panel and a watertight rheostat.

The drum controller has a vertical straight line operating lever. Moving this lever which is equipped with a spade type handle in one direction releases the brake and starts the motor in the "hoisting" direction. Further movement of the handle cuts out the resistor in the motor circuit until finally the motor is running at full speed and developing full power. One-half normal speed is obtained on the first point of the controller when hoisting full load. Returning the handle to the off or neutral position stops the motor, sets the brake and holds the load in whatever position it happens to be. Moving the lever to the opposite direction releases the brake and causes the motor to start in the opposite direction. The controller is arranged to provide power for lowering an empty hook or a light load.

Dynamic Braking Is Used

In case a heavy load is being lowered, which would result in overhauling of the winding drum, the load is retarded automatically by dynamic braking. The connections established within the drum controller are such that the overhauling load is prevented from attaining a dangerous speed. To accomplish this, the motor functions as a generator and exerts a restraining torque, which limits the lowering speed.

The interior construction of the drum controller conforms to the requirements of this class of service. A notched star wheel is provided so that the operator can distinctly feel the different speed points and the off position. A positive latch stops the controller handle in the off or neutral position. All contact parts are of copper and are renewable. The different circuits are separated by arc barriers of an insulating material and no wood is used whatsoever, in conformity with experience gained in severe service under practical operating conditions.

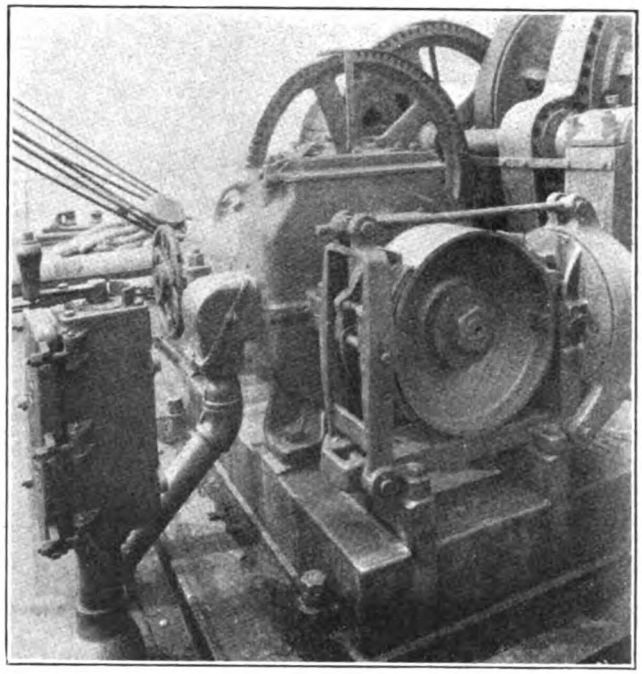


FIG. 2—WATERTIGHT SOLENOID SHOE BRAKE FOR ANCHOR WINDLASS ON M. S. GULFPRIDE

The protective panel contains a main line magnetic contactor and an overload relay. This protector panel serves three purposes.

1. In case of power failure or voltage failure, no damage to the electrical equipment will result and the motor will fail to restart when the voltage returns should the operator accidentally leave the controller handle in the running position. It is necessary to return the operating handle to the "off" or neutral position before the equipment can again be operated after a voltage failure.

2. An overload relay with time delay feature will interrupt the motor circuit and thus protect the motor from burn-out in event of dangerous overloads.

3. An electrical interlock on the watertight rheostat covers in conjunction with the magnetic contactor on the protective panel serve to make the equipment inoperative, should the operator fail to open the ventilating covers on the resistor before starting to operate the equipment.

The starting, speed regulating and dynamic braking resistor is mounted in a watertight case, having a top and bottom cover that can be raised and lowered to permit of ventilation when the controller is in operation.

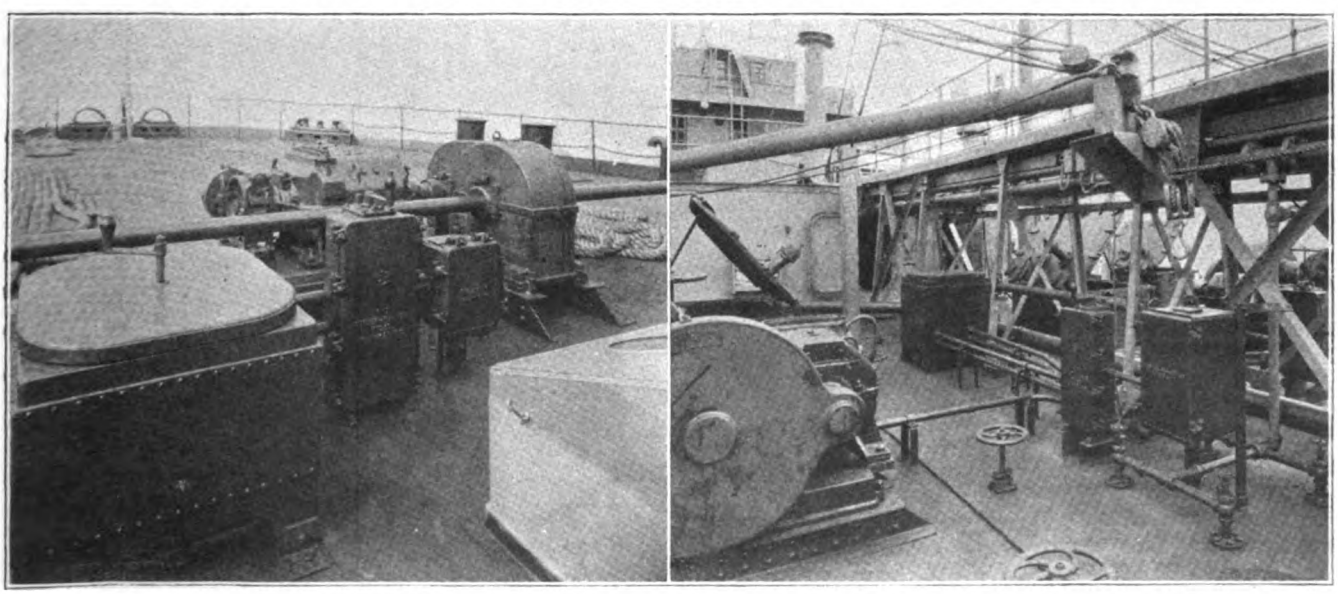


FIG. 3—AUXILIARIES OF M. S. GULFPRIDE. LEFT—WARPING WINCH AND CONTROLLER. RIGHT—MOORING WINCH WITH RADIAL DRUM CONTROLLER

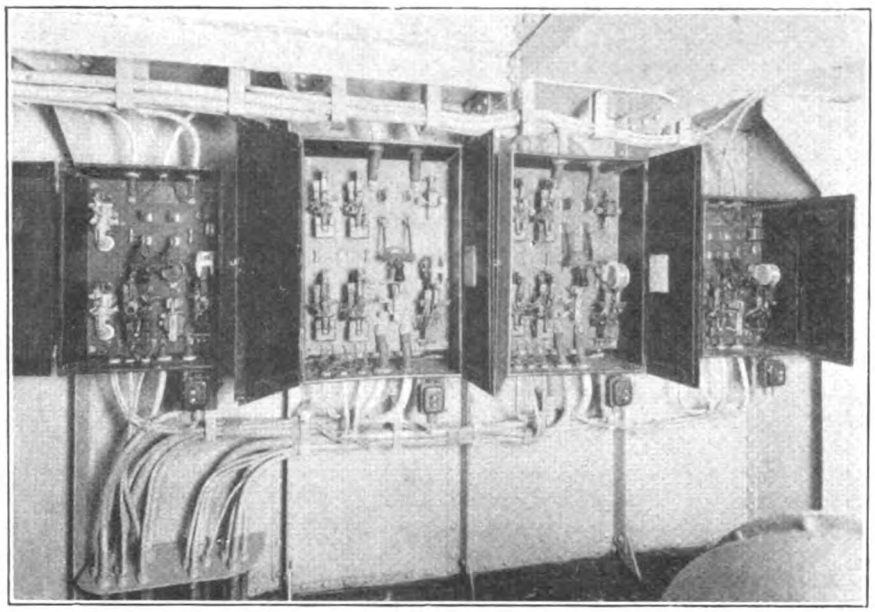


FIG. 4—FULL AUTOMATIC STARTERS FOR CARGO PUMPS ON M. S. GULFPRIDE

The heat developed in the resistor is such that ventilation is necessary, but by closing the cover the resistor is protected from the elements when the vessel is at sea.

The warping winch, Fig. 3, uses a similar controller, except that a radial operating handle instead of the vertical handle is used. This controller functions somewhat differently since it is not necessary to protect against an overhauling load, but rather to provide full torque and full power in both directions. The protective panel provides protection against voltage failure and heavy overload and the magnetic brake on the motor shaft definitely locks the motor in any position when the power is off.

The mooring winch, Fig. 3, also uses a drum controller with a radial drive and a protective panel mounted in watertight cases. These winches are driven by 20-horsepower compound wound motors. The protective panel on a mooring winch differs from that previously described for the cargo or warping winch in that it contains a feature described as "jam protection." In mooring the ship the motor stalls when the ship is tied up against the pier. A stalled motor draws a dangerously heavy current from the line and exerts an exceedingly heavy torque on the motor shaft, so that either electrical or mechanical trouble would result unless precautions are taken to prevent this condition. The protective panel on the mooring winch contains a jam relay which functions to insert a step of resistor in the motor circuit when the motor stalls thus limiting the motor current to its safe value and maintaining the desired torque on the motor shaft instead of opening the power circuit and applying the brake.

The anchor windlass, Fig. 2, requires a great deal more power and uses 75-horsepower. With a motor of this rating it is preferable to use remote magnetic control instead of a manual drum controller. A watertight multispeed reversing master controller is therefore installed adjacent to the anchor windless and an enclosed magnetic contactor panel below deck which functions in response to the master controller above deck serves to control the motor. This controller is arranged to provide for power hoisting, dynamic braking, for lowering and jam protection to protect the motor in pulling the anchor loose. In other words instead of interrupting the power to the motor entirely due to the heavy current which would flow under these conditions, an additional step of resistance is inserted in the motor circuit, so as to maintain a tension on the chain.

The tanker requires some other auxiliaries in addition to those ordinarily required on a freight motor ship. Large pumps must be furnished for handling the cargo. On the GULFPRIDE there are two pumps, each driven by a 200-horsepower motor and two pumps each driven by a 60-horsepower motor. The starters for these motors are of the full automatic type illustrated in Fig. 4. Pushbuttons are provided for local control and also for control from a remote point. These automatic starters incorporate main line knife switch, overload protection, low-voltage protection, automatic current limit acceleration, pilot fuses and speed regulation by field control. All parts used on these automatic starters are either brass or bronze or zinc plated to prevent corrosion. The resistors are moisture proof and the enclosing cases are such as to exclude moisture dripping from above.

The motors used on the cargo

(*Continued on Page* 41)

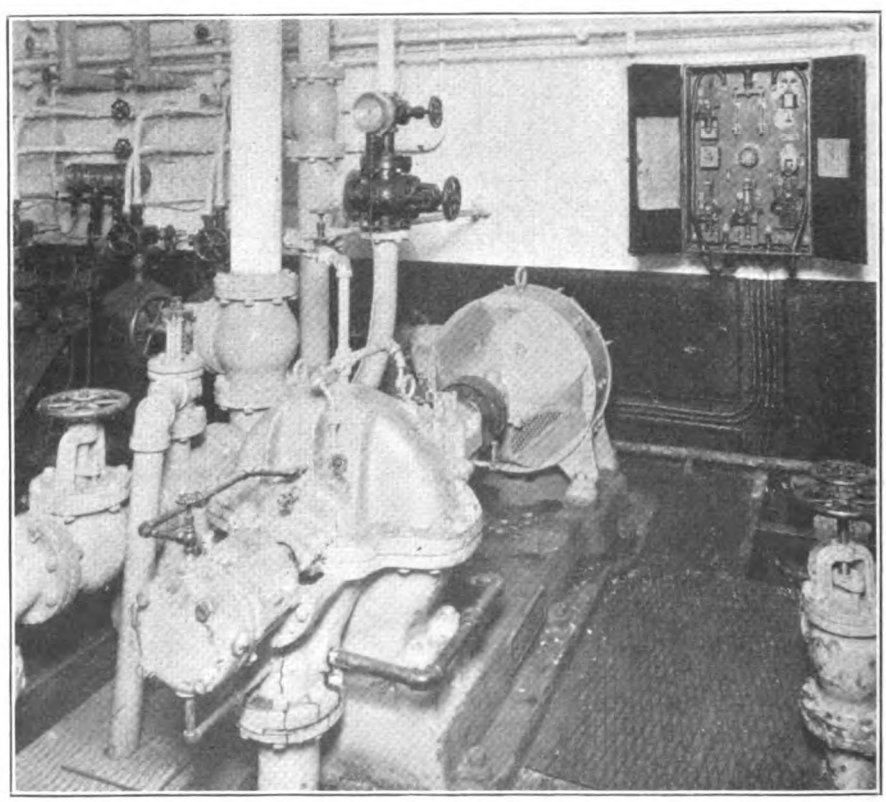


FIG. 5—AUTOMATIC STARTER FOR FIRE AND BALLAST PUMP ON M. S. GULFPRIDE

Electric Propulsion is Increasing

Review of Electrical Developments in Marine Field During 1927—Growth in Number and Size of Electric Drive Vessels

BY D. W. NIVEN

SINCE the first commercial application of electric propulsion in 1908, when the Chicago fireboat GRAEME STEWART was placed in commission, there has been a consistent growth in the number and size of electrically-propelled craft.

At the close of the year 1927 there had been placed in commission or were under construction a total of 118 electrically-propelled vessels of various types, ranging from river towboats and small yachts to the largest types of seagoing ships. The equipment of these craft aggregated more than 700,000 shaft horsepower, about 92 per cent of the primary power being supplied by turbines and 8 per cent by diesel engines.

The General Electric propelling equipments constitute about 84 per cent of the total shaft horsepower involved and consist of 29 turbine-electric drives totaling 566,250 shaft horsepower and 38 diesel-electric drives totaling 33,800 shaft horsepower.

Turbine Electric Propulsion

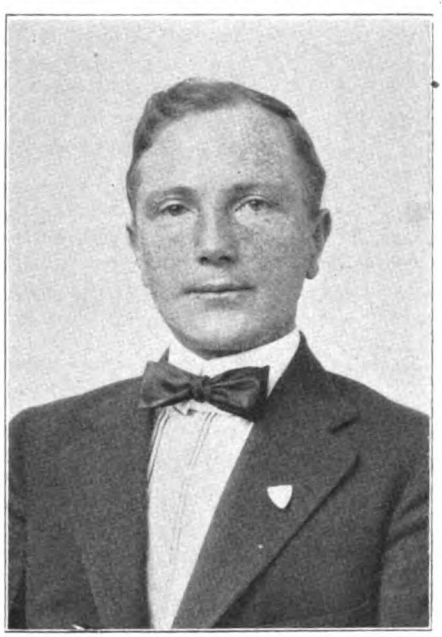
The outstanding event of the year was the completion and installation of turbine-electric propelling equipment for the Panama Pacific liner CALIFORNIA, the largest passenger ship ever built in the United States and the largest electrically-driven ship of her class in the world. The CALIFORNIA is a twin-screw ship with a displacement of 30,300 tons at a load draft of 32 feet 3 inches.

The maximum energy delivered to her propeller shafts is 17,000 shaft horsepower and a speed of 18 knots can be maintained with this power input. At the cruising speed of 16.5 knots, the output of the turbine-generator is 13,500 shaft horsepower, and at this speed the ship has a cruising radius of 15,400 miles.

The propelling equipment comprises two 16-stage, steam-turbine generators, each having a maximum capacity of 6600 kilowatts at 2880 revolutions per minute. This power is transmitted to the propeller shafts by means of two synchronous-induction type motors having a continuous maximum rating of 8500 shaft horsepower at 120 revolutions per minute. These motors are direct connected to the propeller shafts and are reversible so that no reversing turbines are required. Both propelling motors can be operated at about three-quarters of their rated output by the current supplied from one of the two turbine-generators, thus insuring economical cruising at reduced speed.

The CALIFORNIA was launched October 1, 1927, at Newport News, Va., and work on a second ship of the same size, to be provided with electric propelling equipment of the same power, is already under way.

The second of the turbine-electric self-unloading limestone carriers for the Bradley Transportation Co. went into service in July, 1927, and, in addition to being the largest bulk freight carrier on the Great Lakes, is of exceptional interest due to the unusual features of her equipment.



D. W. NIVEN

The power developed is normally about 4200 shaft horsepower, but the turbine-generators are capable of a maximum continuous output of 4800 shaft horsepower. The steam conditions represent a marked advance over ordinary marine practice in that the turbines are supplied at 300 pounds pressure and a total temperature of 700 degrees Fahr. and will operate ordinarily with a 28½-inch vacuum.

The electric auxiliaries for use when under way are driven from the main unit directly or from a motor-generator set which operates from the main unit, while the electric equipment for unloading cargo in port is driven directly from the main unit. When under way, a variation in the revolutions per minute of the propeller is accomplished by varying the speed of the turbine. In port, the main turbine is run at constant speed and, in case maneuvering is required simultaneously with the unloading operation, variation in the propeller speed is accomplished by means of resistance inserted in the secondary circuit of the propelling motor.

Diesel Electric Propulsion

Early in the year the new diesel-electric coast guard cutter, NORTHLAND was launched at Newport News, Va., and is now serving on patrol in the Alaskan waters as the successor of the famous patrol cutter BEAR built in 1874.

The main engine room equipment consists of two diesel engine-driven generators, each rated 410 kilowatts, 250 volts at 200 revolutions per minute. These supply current to a double unit type, shunt-wound propeller motor. Each section of this motor is rated 500 horsepower at 120 revolutions per minute. The NORTHLAND develops a speed of 12 knots with her single propeller operating at 120 revolutions per minute and the motor developing 1000 shaft horsepower. The control is located in the engine room and is of the variable-voltage type.

There are some unusual features in the propelling equipment, one of them being the use of a magnetic clutch between the motor and the propeller shaft. Under normal conditions the motor and shaft are rigidly bolted together, but when cruising at reduced speed in the ice fields the bolts will be removed and the power transmitted through the magnetic clutch. This will transmit a torque equivalent to 500 shaft horsepower at 95 revolutions per minute, but any increase of load beyond this rating will cause the clutch to slip and will thus prevent dangerous stresses.

(*Continued on Page* 52)

The author, D. W. Niven, is manager of the Federal and Marine department of the General Electric Co., Schenectady, N. Y.

Geared Turbines Prove Reliable

Japanese Install Set of American Made Turbines Without Drawings or Instructions—Operate Vessel Over Long Period With Entire Success

BY CARL. J. LAMB

IN THE March 1927 issue of MARINE REVIEW appeared the "Seven Year Record of S. S. ALGIC." The recent arrival of the Japanese S. S. TOHSEI MARU in New York brought to light the history of a geared turbine propelling unit, which, from the viewpoint of simplicity, ruggedness and reliability, will equal the record of the ALGIC and wll attract the interest of all ship operators and marine engineers.

Back in October, 1919, Takata and Co., representative in Japan at that time for the Westinghouse Electric International Co., sold to the Uraga Dock Yards a complete steam propelling unit which was quite similar to those of the merchant class installed aboard the S. S. ALGIC, ALA, and some 120 other war-built vessels of the same type. This machinery, when delivered, was not installed, as the hull planned was not then complete. It was later used in the TOHSEI MARU.

The remarkable thing about the geared turbines in the TOHSEI MARU is not so much the recorded mileage and freedom from trouble, but the fact that, after being delivered in March, 1920, this equipment remained in a warehouse until 1925, when it was installed by native Japanese mechanics under Mr. Tomali, now chief engineer of the TOHSEI MARU, unaided by blueprints, records, installation instructions, or any person who had ever installed, operated, or even seen this type of turbine before, and was then operated 50,000 miles, without any service, advice, visits, or operating instructions from the designer and builder of the machinery.

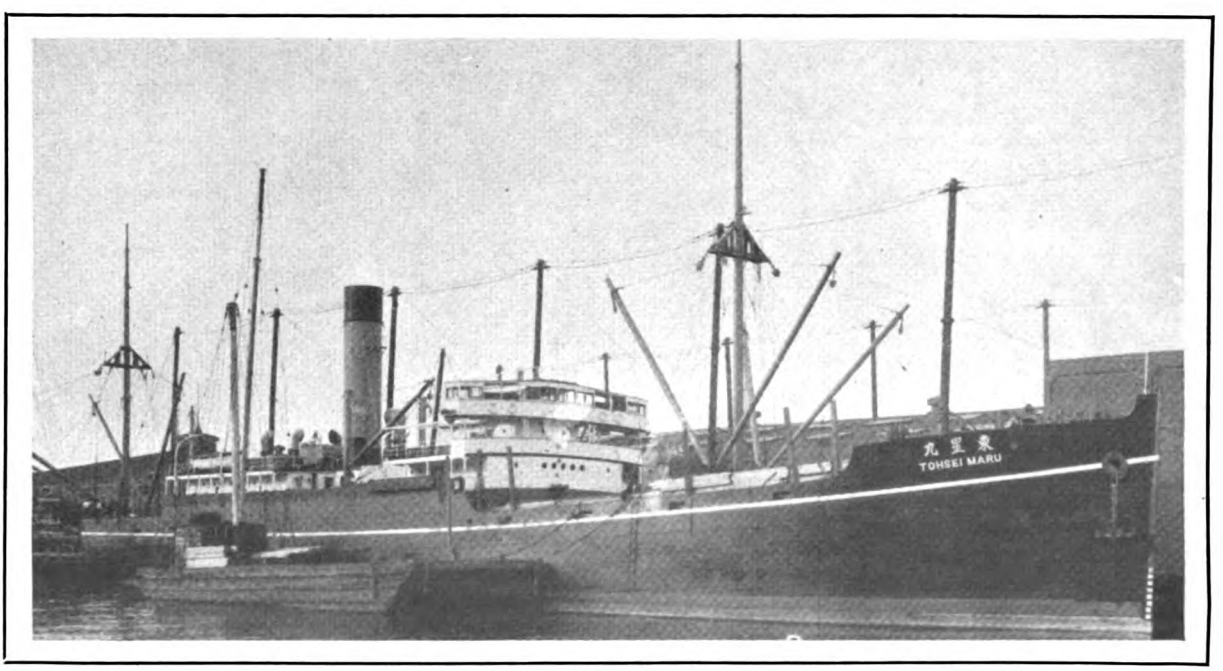
When the earthquake occurred in Japan during August, 1924, considerable damage was occasioned at the shipyard, and particularly to the warehouse in which the machinery which went into the TOHSEI MARU was stored, some of the smaller fittings of the turbines being injured as a result. The plans, installation instructions and operating instructions were destroyed completely.

Mr. Tomali, the present chief engineer, of the vessel, who had been detailed by the Yamashita Co., which had contracted with Uraga Dock Yard for the building of TOHSEI MARU, to inspect the installation of machinery in the vessel, also actually supervised the work as well. He has reported that all of the propelling and auxiliary machinery was easily installed, with less time and labor than is usually attendant upon the erection of typical reciprocating steam machinery such as is found in the average Japanese merchant vessel.

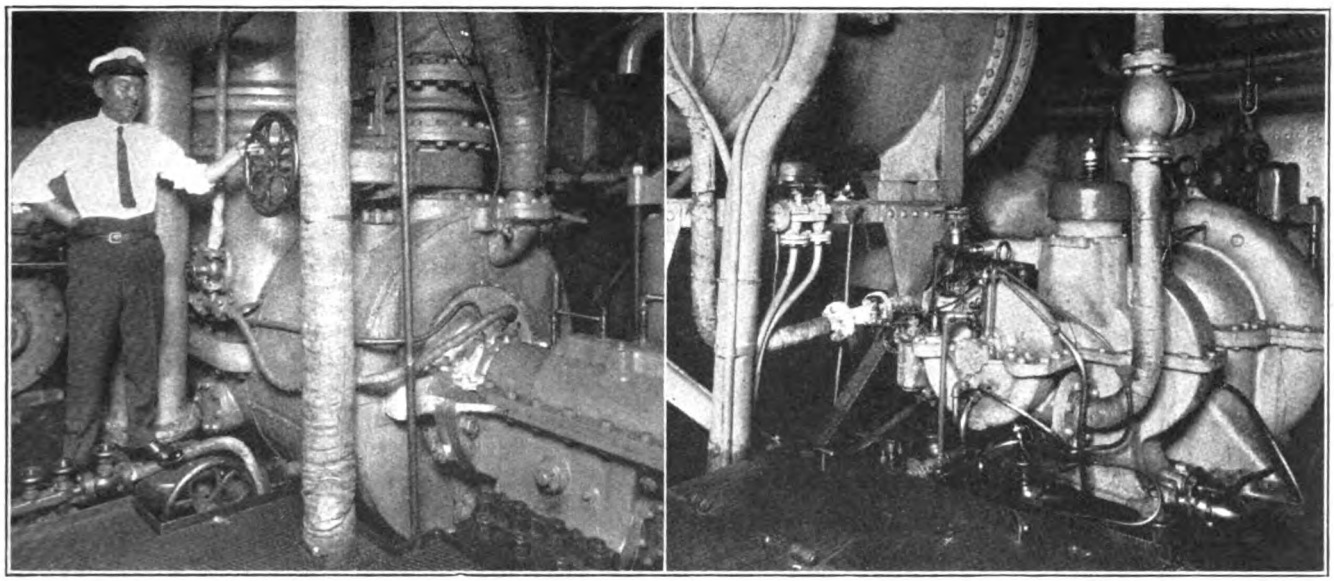
Unlike the ALGIC, the TOHSEI MARU is not on a scheduled steady run, but visits various ports of the world, wherever porfitable cargoes can be obtained. When she recently entered at New York in September, she carried a full cargo of lumber from Vancouver, B. C., to Wilford & McKay. After receiving partial cargo in New York, she departed to complete loading at Providence, R. I., whence she sailed for the West Coast and the Far East.

An inspection of the vessel by the writer brought forth the preceding and subsequent facts from the chief engineer, who further remarked that, up to the time of the interview, there had never been a breakdown of any of the American-built machinery herein described, nor had any repairs

The author, Carl J. Lamb, is a member of the engineering staff of the Westinghouse Electric & Mfg. Co. at its South Philadelphia Works.



Japanese S. S. Toshei Maru at Pier, 135th Street and Hudson River, New York



ENGINE ROOM S. S. TOSHEI MARU—AT LEFT—LOW PRESSURE TURBINE, EXHAUST TRUNK, CROSS OVER PIPING, KINGSBURY THRUST. AT RIGHT—MAIN CONDENSER AND TURBINE-DRIVEN CIRCULATING PUMP

been made to it, other than routine maintenance overhauls. Mr. Tomali also stated that the Yamashita Co., which operates a fleet of twenty cargo vessels under the Japanese flag, had just about decided to abandon a previously planned program of diesel propelled vessels and stick to geared turbine propulsion for future construction because of the established economy, reliability and ruggedness of the geared turbines in the TOHSEI MARU over a two-year operating period.

The appearance of the entire ship, as an examination of the accompanying photographs indicate, was excellent, cleanliness and good order prevailing, without signs of deterioration, throughout the hull, on deck, and in the engine room spaces.

Although of the same general design as the merchant ship type of geared turbines built for the United States shipping board, the unit in question represents later engineering practice, being among the first marine installations to have the Westinghouse patented (Schmidt) oil governors.

Due to the slower propeller speed of 70 revolutions per minute, the gear reduction is greater, the ratio being 51.4 to 1. The second reduction gear elements have a tooth pressure of 995 pounds per inch length of active tooth face at the designed 3000-shaft horsepower, and the first reduction elements have a tooth pressure of 510 pounds per inch length. These gears, in conformity with the builder's standard practice, are of the famous flexible pinion frame design, invented in 1907 by Admiral Melville, formerly engineer in chief, United States navy, and Mr. McAlpine, and first installed in the collier U. S. S. NEPTUNE. It is worthy of note here that the Japanese navy has had installed in three very

(*Continued on Page* 38)

TABLE I

Particulars Toshei Maru

Hull

Length, overall, ft., ins.	400	0
Beam, molded, ft., ins.	53	0
Depth, molded, at side to upper deck, ft., ins.	32	0
Draft, loaded, ft., ins.	25	0
Gross tonnage, Japan		5484
Speed, normal in service, with average sea conditions and clean bottom, knots		11.25

Machinery

Classification—Lloyd's

Main Engine: One Westinghouse 3600-r. p. m. impulse-reaction, cross-compound type turbine unit, consisting of a high and a low pressure turbine, each connected to first reduction pinion through a quill shaft and flexible coupling.

Total shaft horsepower	3000
Steam pressure at throttle, lbs.	200
Superheat, degrees Fahrenheit	120
Water rate guaranteed in lbs. per s. h. p. per hour	10.35
Vacuum, referred to 30-inch barometer, in inches of mercury	28
Reversing power in S. H. P.	1800

Gears

Westinghouse (Melville-McAlpine), single case, double reduction flexible frame type—pinions and gears double helical with involute teeth.

Speed reduction in r. p. m. from turbines to propeller 3600 to 70

Auxiliaries

Westinghouse main and auxiliary condensers of 4000 and 800 square feet cooling surface, respectively.

Main circulating pump unit of 4000 gallons per minute—turbine driven.

Two condensate pump units of 50,000 pounds water per hour, each turbine-driven.

Two air ejectors, type E.

One air separator.

Thrust bearings, of Kingsbury type, manufactured by Westinghouse Electric & Mfg. Co.

CHIEF ENGINEER TOMALI AT MANEUVERING VALVE OF TOSHEI MARU

TABLE II

Main Machinery Weights

Note: All weights are in pounds

Main h. p. turbine	14,000
Main l. p. turbine	18,000
Main reduction gear	93,000
Main steam strainer	350
Main governor valve	1,350
Main maneuvering vale	1,300
Cross-connecting piping and valves, including those for emergency operation of either turbine as an independent unit,	
Main exhaust trunk	12,000
Main expansion joint	120
Main condenser	28,500
Main circulating pump unit	6,000
Two main condensate pumps	2,000
Two main air ejectors	200
Air separator	800
Total in pounds	**186,420**
Auxiliary condenser, with pumps	8,200

What the British Are Doing

Short Surveys of Important Activities in Maritime Centers of Island Empire

THE DUCHESS OF ATHOLL is the first of four liners which are being built on the Clyde for the Canadian Pacific Railway Co.'s service between Liverpool and Montreal. She is 600 feet long, 75 feet in breadth and 53 feet in depth to bridge deck, 27 feet in draft, of 8750 tons deadweight, 21,500 tons gross, 20,000 shaft horsepower, and 17½ knots service speed. She has seven decks and accommodation will be provided for 600 cabin passengers and 1000 third class passengers. The vessel, which is the largest yet designed specially for carrying only two classes of passengers, and will be the largest sailing to the port of Montreal, will be propelled by two sets of Parsons turbines driving twin screws through single reduction helical gearing, developing a total of 20,000 shaft horsepower. Steam will be obtained from six watertube boilers of the Yarrow type, designed by Yarrow & Co., made by Beardmore, and working at the high pressure of 370 pounds per square inch. All the machinery will be supplied by the builders. The DUCHESS OF ATHOLL will sail on her maiden voyage on June 1.

* * *

ALEXANDER Stephen & Sons Ltd. of Linthouse has launched the twin-screw motor-propelled oiltanker VICTOLITE, which it has built to the order of Imperial Oil Ltd., Toronto. The vessel which is 510 feet long 68 feet in breadth, of 12,000 tons gross and 16,000 tons deadweight on a draft of 28 feet will be propelled by two sets of single-acting, two-cycle, four-cylinder engines made by Fried. Krupp, Germany, and fitted on board by the builders. The oil cargo will be carried in 20 main and ten summer tanks. The vessel which has been constructed on the Isherwood bracketless system under the supervision of Sir J. W. Isherwood & Co., Ltd., is the first of two for the same owners. The machinery of the second ship will consist of Stephen-Sulzer engines made by the builders.

* * *

PALMERS Shipbuilding & Iron Co., Jarrow on Tyne has obtained from the Gulf Refining Co., Philadelphia, an order for three small tankers, in addition to several booked earlier this year. The builders will also supply propelling machinery.

* * *

BRITAIN'S great Atlantic lines—the Cunard and the White Star—are in keen rivalry for the distinction of owning the biggest passenger ship afloat. The largest liners in the world are the LEVIATHAN (U. S.) 59,956 tons, MAJESTIC (White Star) 56,551 tons, BERENGARIA (Cunard) 52,226, OLYMPIC (White Star) 46,439 and the AQUITANIA (Cunard) 45,647 tons. The White Star has ordered from Harland & Wolff, the famous Belfast firm, a vessel that will be bigger and longer than the MAJESTIC, which with its length overall of 954 feet 6 inches is at present the largest ship in the world. The Cunard officials are discussing details of a new 60,000-ton luxury liner. Harland & Wolff recently launched in one day one vessel from each of their Govan, Greenock, and Belfast yards, and delivered one launched recently at Govan. This is believed to be a record of work done in one day by one shipbuilding firm.

* * *

FIVE cargo steamers of 10,000 tons deadweight each have been placed by Hadin & Co. on behalf of the United British Steamship Co. Two of these vessels are to be built by Armstrong, Whitworth & Co. and two by the Northumberland Shipbuilding Co. The fifth ship is to be built by the Fairfield Shipbuilding Co. These orders will give work to many.

What's Doing Around The Lakes

IRON and steel scrap dealers in the Chicago district, in view of a usually heavy overproduction of scrap in that territory, are considering the advisability of shipping considerable quantities of scrap next season to Buffalo and other eastern points by Great Lakes vessels. Present rail rates preclude shipping of scrap to any extent out of the Chicago district. The movement of 30,000 to 35,000 tons of pig iron into the Chicago district during the past season by steamers directed the attention of the scrap industry to the possibilities of marketing surplus scrap in other territories next year despite the railroad freight rate handicap. It is pointed out that Great Lakes vessels are much better adapted to handle scrap iron and steel cargoes than has been the case in previous years.

* * *

IN THE recommendations for rivers and harbors appropriations made to congress by Major General Jadwin, chief of the army engineers, the Calumet harbor and river in Illinois is assigned $53,000 for maintenance. The Michigan City harbor on Lake Michigan would be awarded $40,000 for improvements and $6,000 for maintenance. The sum of $30,000 is recommended for maintenance at Indiana Harbor. It is believed that these recommendations will be approved.

ALOSS of nearly 2,000,000 tons in freight shipments through the Soo locks during the past season is indicated by the report of the government canal superintendent. The report states that 82,195,158 tons had passed this season up to Dec. 1, as compared with 84,292,340 tons in the similar period in 1926. November shipments of 115,363,546 bushels of grain brought the month's total to 6,897,670 tons, comparing unfavorably with 8,169,936 tons a year ago. The locks were closed Dec. 14.

* * *

THE heavy windstorms on Lake Michigan the early part of December had little deterrent effect on

schedules of boats now operating on winter schedule. No serious disasters were reported. The winter schedules are unchanged from last year.

* * *

GREAT LAKES traffic lines report satisfactory results from the operation of the motor truck feeder lines, which convey freight shipments to lake ports. Several of these motor truck lines have been added by Lake Michigan transport companies in the past few years and their operation is considered highly successful. It is understood no immediate expansion of these lines is contemplated at this time.

* * *

UNDER the chairmanship of Newton D. Baker, former secretary of war, attorney generals of the Great Lakes states met in Chicago during December for conferences on the next step in their fight to check Chicago's diversion of lake water. The petitioning states of Wisconsin, Michigan, Minnesota, Pennsylvania and New York had ready to file their answers by Jan. 2 to the adverse report of Charles E. Hughes, who as special master, heard the evidence in the suit brought by Great Lakes states to prevent withdrawal of water into the Chicago drainage canal. Mr. Baker, acting as special assistant for the state of Ohio, said rapid progress had been made in formulating the answers.

* * *

PRELIMINARY plans for the Chicago world's fair of 1933 contemplate the building of a number of islands in Lake Michigan, offshore of the park systems of Chicago, on which buildings are to be erected. Rufus C. Dawes, brother of Vice President Dawes, has been selected as chairman of the Chicago world's fair committee.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to Dec. 20, 1927 on Future Loadings

NOTE: FREIGHT RATES STEADY WITH SLIGHT CHANGE

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	General cargo 100 lbs.	††Finished steel	REMARKS Freight Offered
Liverpool	2s 3d‡	$0.60	$0.40	0.20	$0.50	$0.90	$8.00T***	Fair
London	2s 6d‡	0.60	0.45	0.20	0.50	0.90	8.00T***	Fair
Oslo	$0.20	0.45	0.50	0.30	0.50	1.00	8.00T	Fair
Copenhagen	0.20	0.45	0.50	0.30	0.50	1.00	8.00T	Fair
Hamburg	0.15	0.55	0.40	0.25	0.50	0.90	10.00T	Fair
Bremen	0.16	0.35	0.50 to 65	0.25	0.50	0.90	10.00T	Good
Rotterdam and Amsterdam	0.12	0.32½	0.40	0.23	0.40	0.75	9.50T	Fair
Antwerp	0.12	0.32½	0.40	0.20	0.45	0.80	9.50T	Fair
Havre	0.14	0.55	0.31	0.30	0.45	0.80	9.00T	Quiet
Bordeaux	0.14	0.55	0.31	0.30	0.45	0.80	9.00T	Quiet
Barcelona	....	0.50	0.30	10.00 bags	—12.00T—		10.00T	Fair
Lisbon	....	0.75	0.50	8.00T bags	—23.00T—		8.00T	Poor
Marseilles	....	0.65	0.40	7.00 bags	—23.00T—		8.00T	Poor
Genoa	0.15	14.25	0.50	9.00	—23.00T—		11.50T	Fair
Naples	0.15	14.25	0.50	9.00	—23.00T—		11.50T	Fair
Constantinople	0.27	20.00T	0.85	0.40½	—24.00T—		11.50T	Fair
Alexandria	....	20.00T	0.85	0.40½	—24.00T—		11.50T	Fair
Algiers	....	0.85	0.60	0.45	—23.00T—		11.50T	Poor
Dakar	....	17.00	....	15.50T	—23.00T—		11.50T	Fair
Capetown	....	18.00	....	13.00	20.00		13.00 to 18.00	Good
Buenos Aires	....	22 00T	....	....	20.00 to 22.00T†		8.00 to 8.80T	Fair
**Rio de Janeiro	....	22.00T	....	....	20.00 to 22.00T†		7.00 to 7.70T†	Fair
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Fair
Havana	0.35*	0.50	....	0.30*	0.61	1.33	10.00	Fair
Vera Cruz	0.25	0.30	0.35	0.25	0.52½	1.05	0.30 to 0.35	Fair
Valparaiso	....	1.07	....	0.70	....	....	10.00T	Fair
San Francisco	....	0.35 to 0.70	....	0.40 to 1.10	....	....	0.25 to 0-30	Fair
Sydney	....	18.00T	1.25	18.00T	18.00-24.00T		9.00 to 12.—T	Very poor
Calcutta	....	....	....	10.00T	—16.00T—		10.00T	Fair

T—Ton. ‡Per quarter of 480 lbs. †Landed. ††Heavy products limited in length. *Extra charge for wharfage. **Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion. ***Plus 15 per cent.

From North Pacific Ports to	Lumber Per m. f.
San Francisco	$4.25 to 4.50
South California	4.50
Hawaiian Islands	9.00 to 10.00
New Zealand	15.00 to 18.00
Sydney	11.00 to 14.00
Melbourne-Adelaide	13.00 to 14.00
California Ports	3.75 to 4.50
Oriental Ports (logs)	15.00 to 16.00
Peru-Chile	11.75 to 14.00
South Africa	20.00 to 22.00
Cuba	16.00 to 17.00
United Kingdom	70s to 90s
United Kingdom (ties)	....
Baltimore-Boston range	$12.00 to 14.00
Florida Range	No rates
Buenos Aires	11.00 to 15.00
North of Hatteras	
China	9.50 to 10.00
Japan	8.50 to 9.50
Japan (logs)	12.00 to 14.00

Flour and Wheat

U. K. and Continent (gross ton) ..... 31s 6d to 35s 0d

Oriental Ports (net tons) .. $3.75 to 4.00

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5½c per barrel. The coal strike in Britain is now settled and freight rates or bunker prices for coal or pig iron are again quoted.

General cargo rates to Havana change daily and are omitted for the time being.

Rates to Calcutta are subject to change without notice. Cotton goes only to Bombay. Landing charge of $2.00 per freight ton at Valparaiso.

Principal Rates To and From United Kingdom

	s	d		s	d
Grain, River Plate to United Kingdom	25	4	Pig iron, United Kingdom to New York or Philadelphia	12	6
Coal, South Wales to Near East	10	4	Iron ore, Bilbao to Cardiff	6	3
Coal, United Kingdom to Buenos Aires	10	6	Iron ore, Huelva to Phila. or Balto	11	0
Manganese Ore, Poti to Philadelphia	$4.00				

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Feb. 18 1927	5.25@5.50	1.81½	5.95c
Mar. 18	5.25@5.50	1.81¼	5.95
Apr. 19	5@5.50	1.75	5.71
May 19	5.65	1.81½	5.63
June 18	5.50	1.71½	5.39
July 19	5.65	1.65	5.24
Aug. 19	5.50	1.71½	5.15
Sept. 20	....	1.65	5.04
Oct. 20	5.65	1.61	5.13
Nov. 18	5.50@5.65	1.46½	5.15
Dec. 20, 1927	5.35@5.65	1.41½	5.15

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
Feb. 18, 1927	5.24@5.50	1.90@1.91	5.64@6 13c
Mar. 18	5 24@5.50	1.95@1.95½	5.38@5 88
Apr. 19	5.15@5.65	1.81@1.86	5.38@5.64
May 19	5.15@5.65	1.75½@1.76	5.14@5 38
June 18	5.00@5.25	1.70	5.12@5.14
July 19	5.00@5.25	1.65@1.70	5.10@5.12
Aug. 19	5.25	1.70@1.71	5.12@5.14
Sept. 20	5.25	1.62@1.65	5.12@5.13
Oct. 20	5.65	1.56	....
Nov. 18	5.20@5.65	1.45@1.46	4.88@5.12
Dec. 20, 1927	5.20@5.65	1.32@1.35	4.88@5.12

Other Ports

Boston, coal, per ton ....

Boston, oil, f. a. s., per barrel ....

Hampton Roads, coal, per ton, f.o.b., piers $4.35 to 4.50

Dec. 10 — Cardiff, coal, per ton 12s 9d

London, coal, per ton ... —s —d

Antwerp, coal, per ton .. 20s 6d

Antwerp, Fuel oil, per ton 80s 0d

Antwerp, Diesel oil, per ton 95s 0d

British ports, Fuel oil ... 75s 0d

British ports, Diesel oil .. 90s 0d

More Attention Should Be Given To All Auxiliary Requirements

By J. Kuttner

AUXILIARIES installed on board a motorship must be more than just an after thought if they are to be a success. The word "auxiliary" literally means "assisting device" and must be taken literally if the auxiliary installation is to fulfill its purpose. This machinery is in nearly all cases as vital to the safety of the ship as the main propelling engines and its character must be such as to give unfailing, faithful service without detracting in any way from the handling of the power plant as a whole. Like all good servants they must be on hand instantly when wanted and must be out of sight and out of mind at all other times.

Basis for Choosing Auxiliaries

Many considerations naturally enter into the choice of auxiliary power. The character of the ship and its service will determine the kind of auxiliary power and the amount and subdivision of it. It is obvious that the auxiliary power required for a motor ferry would be different from that installed on an ocean-going motor liner while a motor tug's auxiliaries would be of still another sort. Whether or not the vessel is to operate mainly in coastal waters would have to be considered and the auxiliary machinery for a lake vessel would have to reflect many of the peculiarities of this kind of ship.

On some special classes of ships, like those engaged in the transport of perishable fruit from the tropics, the heavy refrigerating load is of fundamental importance, affecting not only auxiliaries; but the main engines as well. In such special cases the entire machinery installation may be subject as much to the refrigerating load as to the requirements of propelling the vessel.

The character of the propelling machinery is also of major importance in the selection of auxiliaries. The air-injection diesel, for instance, will require multi-stage air compressing equipment, whereas a continuous-pressure solid-injection engine operating on the Vickers system or equivalent will often be supported by extra sets of hydraulic pumps. Impulse-injection engines operating with moderate fuel pressures require neither hydraulic nor pneumatic high-pressure auxiliaries, and in general impose least upon the auxiliary power system.

Not long ago the selection of auxiliaries was also bound up with the question of power distribution. After the first motorships made their appearance considerable time elapsed before the donkey boiler and steam-driven auxiliaries were finally and unequivocally discredited for general motorship service. Steam auxiliaries may be justified under certain conditions on steam vessels, though even on such vessels, electricity is coming into use, but they have entirely failed to hold their place on all motorships except tankers designed for transporting heavy viscous oils that require an extensive heating service. The diesel electric drive for auxiliaries has become standard.

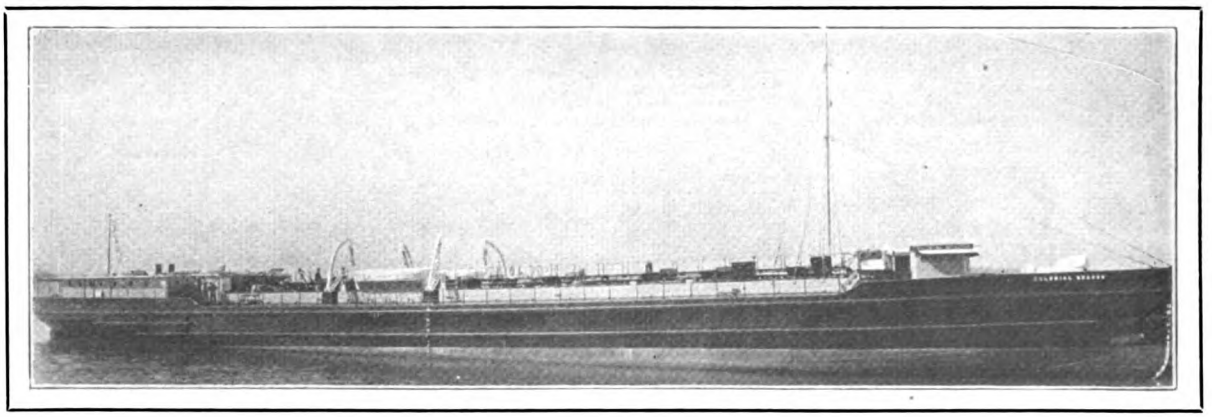
Originally opposed by the same prejudice as that which briefly delayed the introduction of the steam lighting dynamo on steamships years ago, the diesel electric auxiliary drive has now won for itself about the same universal approval. The economy, convenience, and safety of diesel electric power for auxiliaries has more than merely overcome prejudice; it has become a standard requirement of the modern motor vessel operator.

Use Electricity on Shipboard

The success of the diesel electric auxiliary on motorships has caused this form of auxiliary power to be chosen in a steadily increasing number of instances for turbine-driven ships. It is not unusual for steam auxiliaries to have a fuel consumption of between five and ten tons per day, whereas the diesel electric auxiliaries doing the same work consume less than one ton per day.

A highly developed technique for installing and wiring up electric gen-

The author, J. Kuttner, is connected with Fairbanks-Morse & Co., and was formerly editor of *Oil Engine Power*. This article was prepared for MARINE REVIEW at the request of the editor.



Twin Screw Diesel Tanker Colonial Beacon—Coastal, Rivers, Canals—Owner, Beacon Oil Co., Boston

erators, switchboards, and motors has supplanted the older systems that had a bad reputation for sensitiveness to salt water. Flexible armored and lead sheathed cable have wiped the slate clean of moisture and corrosion troubles, so that the electric leads in a properly installed marine system now require less maintenance than the piping for steam auxiliaries.

Generators and motors fully equal to marine requirements have been reduced to standard specifications. When the problem of water proofing marine motors was originally taken up years ago there was a tendency to enclose them so completely that they lost in rating because of inability to dissipate heat. In recent years, however, there has been developed and standardized an enclosed ventilated type of electrical machine which avoids the weaknesses of the open machine and the rating loss of the fully enclosed type. The enclosed ventilated machine is more than proof against the heaviest splashing, short of actual flooding, that may occur in an engine room. When there is enough water to stop the modern marine-type motor, it is time to begin thinking about the life boats.

Colonial Beacon as an Example

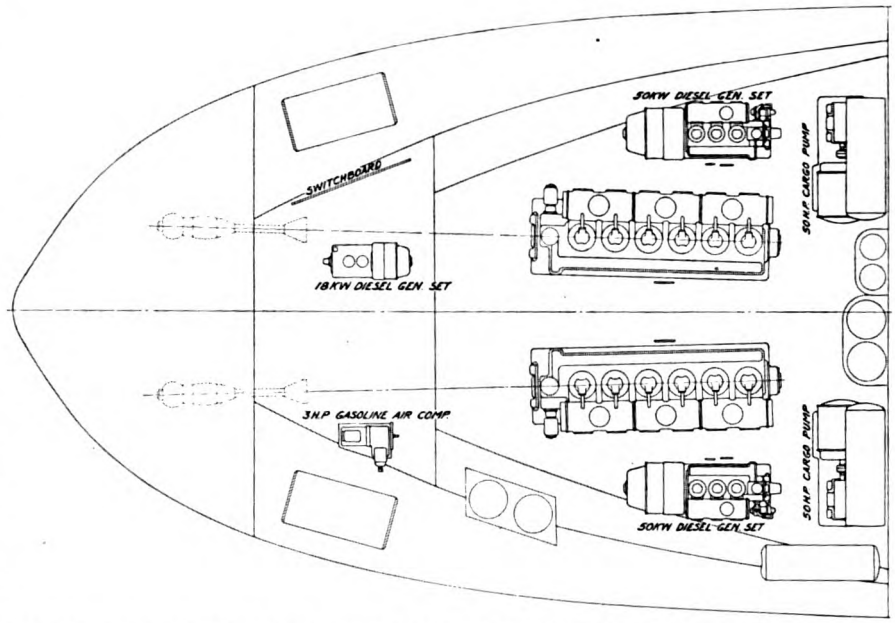
Briefly summarized, the selection of motorship auxiliaries depends on: 1. The character of the vessel. 2. The nature of the service. 3. The kind of main diesel engines. 4. The system of power distribution.

A vessel that gives a good opportunity for studying auxiliary power plant arrangement is the COLONIAL BEACON, a tanker built for the Beacon Oil Co. by the Sun Shipbuilding & Dry Dock Co. Her special character as a tanker, her service in coastal inland, and canal waters, and her airless-injection two-cycle main and auxiliary diesels make her an interesting example to study. Her leading dimensions are:

General Particulars

Length, ft., ins.	253 6
Beam, ft., ins.	40 0
Molded, depth, ft., ins.	15 0
Loaded draft, ft., ins.	12 0
Main engines (2) b. h. p.	720
Diesel generators (2) k. w.	100
Diesel generator (1) k. w.	18

The COLONIAL BEACON is now being operated in coastal and inland waters, her dimensions being such as to clear the locks and bridges encountered there. She is used mainly for carrying gasoline and light oils from refineries at tidewater to inland distributing points. Her twin screws are directly driven by two six-cylinder Fairbanks-Morse two-cycle diesel engines, developing 360 horsepower each at 250 revolutions per minute.



LAYOUT OF AUXILIARIES IN COLONIAL BEACON—REFERRED TO IN THIS ARTICLE

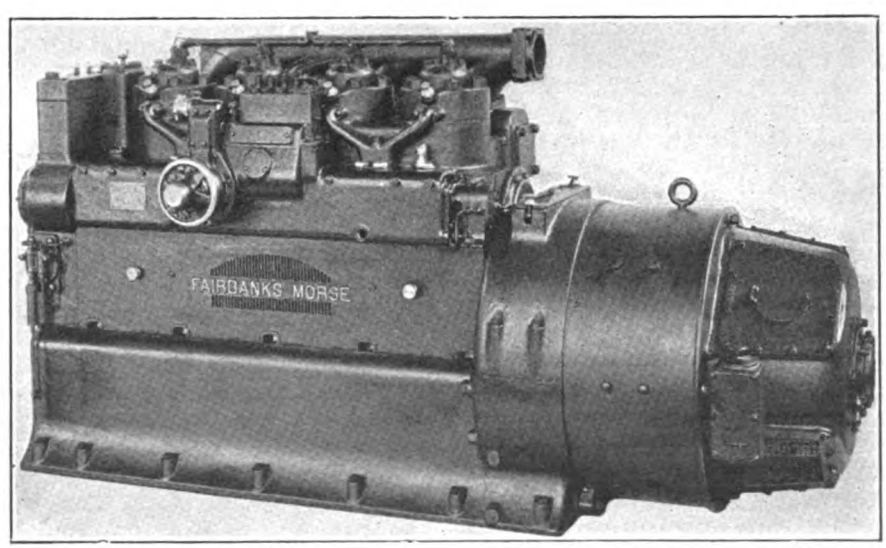
Auxiliary power is furnished by two Fairbanks-Morse diesel generators of 50 kilowatts each and one 18-kilowatt diesel generator of the same make.

A motor tanker is exactly similar to other cargo motorships insofar as its auxiliary power load is made up of the three subdivisions comprising: 1. Lighting and heating. 2. Cargo handling. 3. Engine room service.

Lighting and Heating

The lighting arrangements on the COLONIAL BEACON have no unusual features, but the heating load is unusually heavy because electric current is used exclusively for cooking and for heating crew's quarters. It is for this reason that at least one of the 50-kilowatt diesel generators must always be kept running so long as there is a crew on board; for lay-up service the 18-kilowatt diesel set is sufficient to supply all necessary lighting and minor services such as bilge pumping.

It is of the utmost importance for tanker service that fire hazards of all kinds can be eliminated by the use of high-compression, cold starting diesel engines. As noted above, even the galley is provided with flameless heat—a godsend for the crews of such a potential floating volcano as a gasoline-loaded boat. Electric cooking may possibly be objected to on the score of expense, the general impression being that such service is intended only for millionaires' houses. But on a motorship with diesel-electric auxiliaries the expense for heating simmers down to the bare fuel cost; the units must be provided anyway for other purposes so that their overhead is accounted for otherwise than by the



A 4-CYLINDER, 40 K. W. DIRECT CURRENT DIESEL GENERATING SET FOR AUXILIARY

heating service. Three-quarters of a cent per kilowatt-hour is about the maximum cost. With the high efficiency attained by modern electric heating devices the 3410 B.t.u. represented by each kilowatt-hour go at least as far as the 12,000 odd B.t.u. available in the fuel required by the diesel generator to produce it. Besides the figures for efficiency, there are many considerations such as being able to shut the heat off instantly when no longer wanted, the possibility of regulating it to a nicety, and its concentration at the spot where it is wanted, that make the diesel-electric B.t.u. in an electric range actually cheaper than an equivalent B.t.u. produced in an oil or coal-fired range.

Cargo Handling Equipment

Ample generating capacity for the heating is on hand because the amount of installed auxiliary power is governed primarily by the requirements for cargo handling. As is well known, all tankers are operated on a quick turn-around, and the length of their stay in port is cut down as much as possible by the installation of large-capacity cargo pumps. The yearly ton miles credited to any tanker depends not only on the main propelling machinery, but also on the capacity of the cargo-handling auxiliaries. The two cargo pumps on the COLONIAL BEACON, are each driven through worm gearing by 50 horsepower electric motors. From this it follows that the proportion of cargo-handling power to the main propelling power is about

$$100 \times \frac{2 \times 50}{2 \times 360} = 14 \text{ per cent, while}$$

the proportion of all auxiliary generating power to main power is

$$100 \times \frac{30 + 2 \times 75}{2 \times 360} = 25 \text{ per cent}$$

Naturally this figure is high because it applies to a tanker; on a cargo vessel it would be more in the neighborhood of 15 to 18 per cent depending on the service.

The cargo-handling load is the measure for the amount of auxiliary power no matter whether the vessel handles liquid or dry cargo; in the latter case the installed power of the deck winches corresponds to the capacity of a tanker's pumping installation. Deck machinery for dry cargo motor vessels is also being electrified at a rate that threatens to supersede all other forms of power. The most important difference between the proportion of auxiliary power on a dry-cargo ship and the tanker is due to the fact that the turn-around of the general motor freighter is not so completely determined by the speed of loading and unloading.

Once the amount of power for cargo-handling has been determined, there is no need for specially computing the load due to the engine-room service, beyond making sure that the auxiliary engines are of such a size as to make it unnecessary to operate more than one of them while at sea.

Power demands for strictly engine-room service are almost nominal on the COLONIAL BEACON, because the main engines have their own attached circulating water pumps and maneuvering air compressors. The main units could be kept turning even if every other wheel on the ship were to stop. Their air compressors are direct driven through large eccentrics on the crankshafts, while a double-acting, crosshead type of circulating pump, and also the lubricating oil transfer pumps are linked to the compressor eccentric rod. As the basis of the main engine lubricating system is a multifeed positive mechanical oiler, the duty of the main engine lubricating oil pumps is light, consisting mainly of handling the oil drainage from the crankpits and the transfer of oil to the filter and lay-shaft bearings. Even the fuel supply to the injection pumps is handled by a low-pressure elevating pump direct-driven from the lay shaft, so that the operation of a distinct fuel oil transfer pump is not essential to the running of the engine.

Two-Cycle Diesel Generator

The capacity of the main engine compressor is ample for all ordinary maneuvering air compressor requirements. But it sometimes happens that the bells come so thick and fast that a compressor of an uneconomically large size would have to be on the engine in order to handle it. This contingency is taken care of on the COLONIAL BEACON by the compressors fitted to the two 50-kilowatt auxiliary diesel generators. Should an abnormal demand for maneuvering air arise for any reason it is necessary only to step over to the auxiliary generator and cut out its unloaders. As the speed of these three cylinder units is 500 revolutions per minute and as the compressor is dimensioned for a six-cylinder engine, the delivery of additional maneuvering air is plentiful and prompt—"We always have more air than we can use," is the verdict of the COLONIAL BEACON operating engineers.

The two-cycle diesel electric generators are also well fitted for their service in other respects. Their three-cylinder cranks spaced at 120 degrees give good inherent balance, while the occurrence of power impulses three times per revolution—one of the consequences of the two-cycle principles—greatly reduces the weight and size of the flywheel required. Because of this fact it becomes possible to mount the entire unit on a compact sub-base, which is nothing but an ordinary bed plate slightly enlarged. At the generator end it is extended sufficiently to enclose the flywheel, the casing thus formed being bored and faced to provide positive centering for the generator frame. The latter carries its own outboard ball bearing which supports the armature shaft extension flanged at the other end of the engine crankshaft.

With the exception of the direct-reversing gear, the mechanical features of the diesel engine parts of the generating sets are similar to the main diesel units. Two-cycle valveless cylinders, unencumbered by any sort of valve operating gear, form the basis of the design. Owing to its extreme simplicity, this description is substantially complete insofar as the major parts of the auxiliary diesels are concerned. All that remains to be noted is the fuel-injection system and governor. Cam actuated plungers inject the fuel into the cylinders through the large diameter nozzles fitted with small spring-loaded check valves. As the fuel enters a precombustion chamber, it need not be injected under excessively high pressure, nor must any unusual requirements for fine atomization be met. Accurate regulation of the injected fuel charge is obtained by connecting the governor to a rod and fingers that control the seating of the fuel pump suction valves.

As previously noted, the auxiliary diesels drive their own air compressors. In addition, they have their own lubricating oil pumps and filter, and are provided with direct driven centrifugal water circulating pumps. Like the main engines, they are therefore entirely self-contained and can be operated independently of any other equipment on the ship.

The initial charge of starting air is supplied by a Fairbanks-Morse 3-horsepower, hand-cranked gasoline engine, direct connected to a 3¾ x 3⅜-inches, air compressor of the same make.

What has been said of the two 50-kilowatt diesel generators in regard

(*Continued on Page* 41)

Standard Heat Symbols

The sectional committee on scientific and engineering symbols and their abbreviations of the American engineering standards committee has completed a proposed tentative set of standard symbols for heat and thermodynamics. The old and corresponding proposed new symbols have been printed. It is the desire of the committee to invite all possible criticism and comment before proceeding further with the proposed standardization. Copies of the tentative draft may be obtained by addressing the American Society of Mechanical Engineers, Engineering Societies building, 29 West Thirty-ninth street, New York City, or by writing to S. McK. Gray, assistant to the committee.

Coos Bay in Thick Fog Goes Hard on Rocks

THE fog, treacherous enemy of "the men who go down to the sea in ships," claimed another victim when the steamer COOS BAY crashed hard upon the jagged rocks near Land's End on the south shore of the Golden Gate, on Oct. 22. At this writing she still lies there with gaping holes in her steel hull, recalling the fate of the tanker LYMAN STEWART which piled up on the rocks a bare half mile further out to sea some years ago, where her battered hull can still be seen, even though broken in two. It is safe to predict that the COOS BAY will be a total loss.

The vessel, which was owned by the Pacific States Lumber Co. and valued at close to a half million dollars, was proceeding slowly to sea in ballast through a murky darkness when the crash came. It is best explained by her commander, Capt. B. W. Olsen, in a statement issued to the press shortly after the accident in which he is quoted as saying:

"So many whistles were blowing as we proceeded out the Gate in the thick fog that I was unable to hear the Mile Rock horn. Steamers coming in were sounding their whistles and these became confused with the siren at Point Bonita on my starboard side. Added to this was the failure of my own whistles to echo distinctly from the cliffs. All were merged into a confusion of sounds.

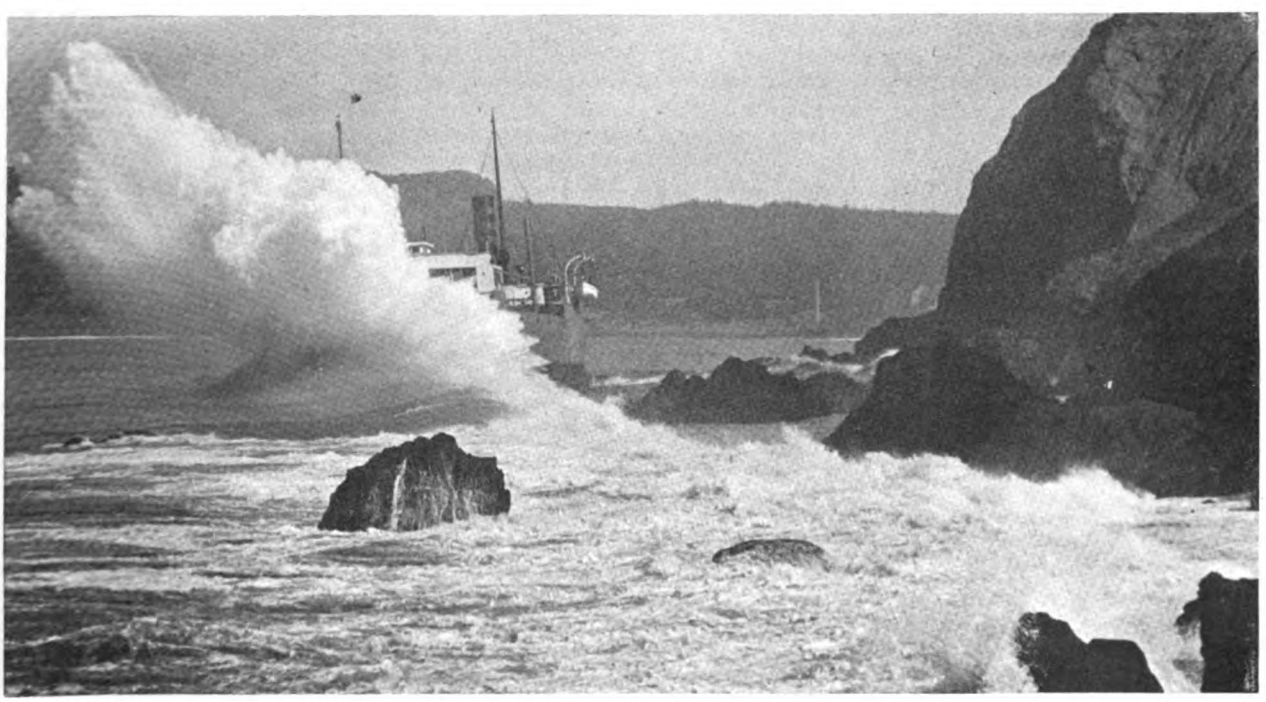
"Fearing I might collide with the incoming vessels I swung the ship over to the south side. We were under a slow bell. The weather was so thick we could see practically no distance ahead. The utmost care was taken. I was on the bridge with the second officer, Mr. Carlson; the chief engineer was in the engine room and there was a lookout from the forecastle head as well as from the bridge.

"Suddenly I heard the surf pounding. The next thing I knew we were on the rocks. Fearing we might be on a shelf, and that we would slide off with the hole in our hull, I took soundings and found we were square aground on the rocks."

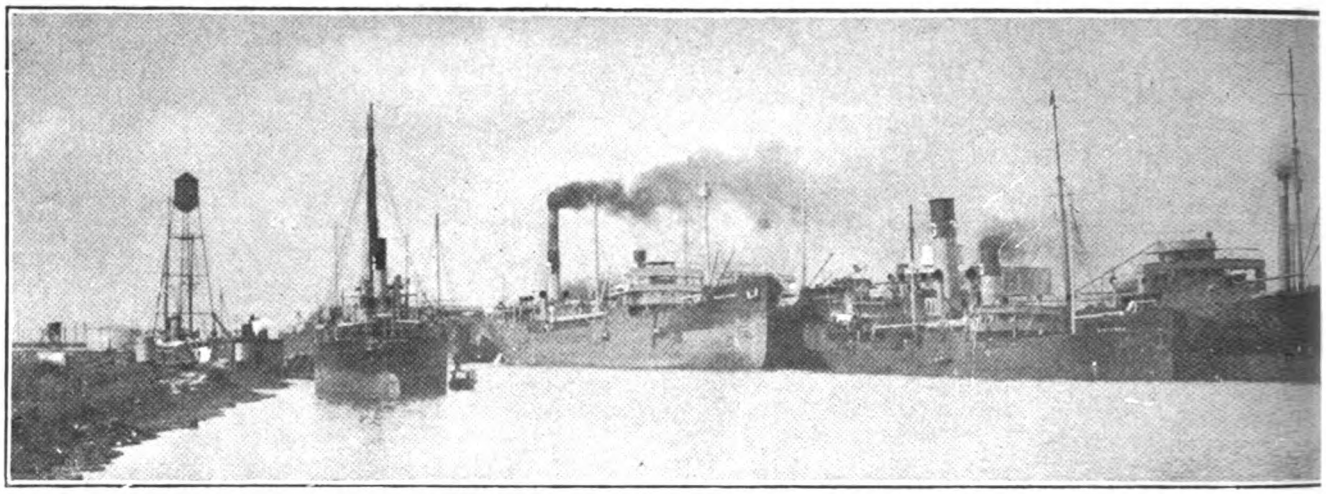
The work of rescue was hampered by fog and darkness and it was not until the morning after the accident that the first man was brought ashore in a breeches-buoy by the crew of the Golden Gate life saving station under command of Captain Roberge. Fourteen men were gotten to land in this manner while the remaining twenty-one were taken off in small boats. There were no casualties.

Capt. B. W. Olsen, her master, has been exonerated of all blame by Capt. J. K. Bulger, supervising inspector, United States steamboat inspection service, and has been commended for his fine seamanship in saving his crew and for his action in refusing to leave the vessel until it was certain that she was stuck on the rocks.

With the exception of the last paragraph, reprinted from the *Fireman's Fund Record*, November, 1927.



Coos Bay on the Rocks at Lands End, Outside Golden Gate, San Francisco



A busy scene along the Docks of Port Arthur—Vessels

Port Arthur Is Steadily Growing As Industrial Shipping Center

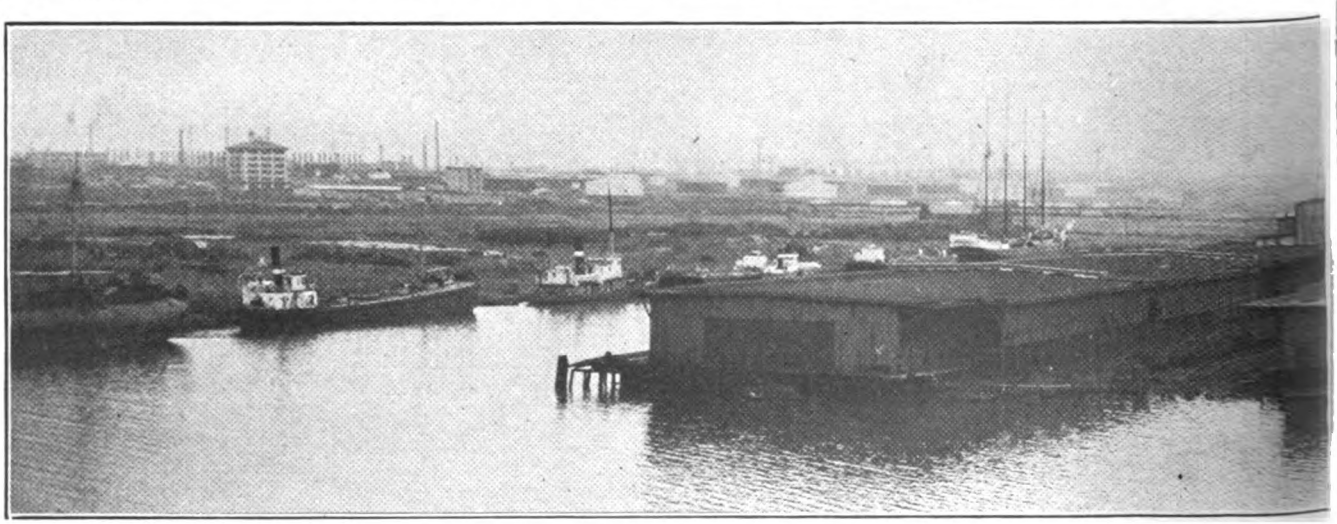
By R. E. McInnis

A FEW years before the beginning of the present century, the region in the southeastern corner of Texas, on the shores of Lake Sabine, was a vast wasteland. Today, in the heart of this region is Port Arthur, the world's largest oil refining center and one of the "big ten" ports of America, ranking with New York, Philadelphia, Baltimore, New Orleans and San Francisco; a city of 50,000 population; a city that is modern in every respect; a city that bids fair to become a great textile manufacturing center; a city that has been called "the wonder city of the Southwest."

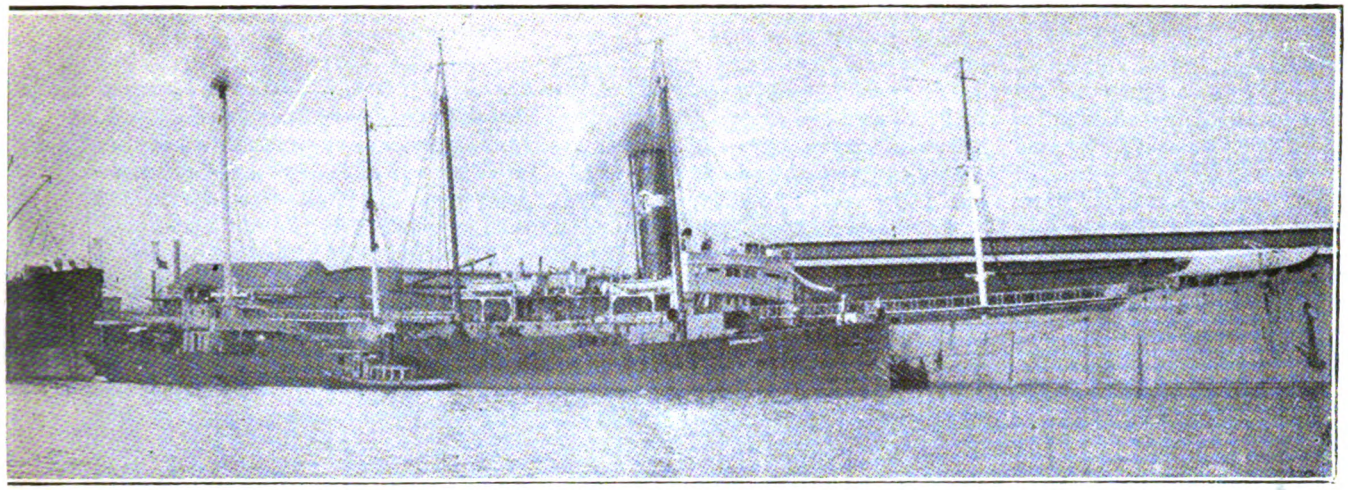
Such, at a glance, is the story of the transformation of a wasteland into a beehive of industry and commerce in little more than a quarter century. There are two names that instantly are called to mind when Port Arthur is mentioned. First, Arthur E. Stillwell, great railroad builder; and, second, John W. Gates, internationally famous capitalist and empire builder.

Arthur Stillwell was the first to decide that there should be a Port Arthur. He conceived the idea of a railroad running north and south and loading cargoes on ships at a Gulf port, thus reducing the cost of freight from the fields of the Middle West to the markets of the nation. The Kansas City Southern railroad, one of the greatest systems in the world today, running "as straight as the crow flies" from Kansas City to Port Arthur was the result. He built his line to Port Arthur and then proceeded to dig a channel to meet his rails. The channel was completed in 1897, and that year Port Arthur loaded ships to the extent of 87,632 tons. The tonnage has grown from year to year until Port Arthur is now recognized as one of the great ports of the Gulf. The accompanying tonnage figures will indicate clearly the extent to which Port

The author, R. E. McInnis, is manager of the traffic department of the Port Arthur, Tex. chamber of commerce.



Port Arthur has been developed along modern ways as a



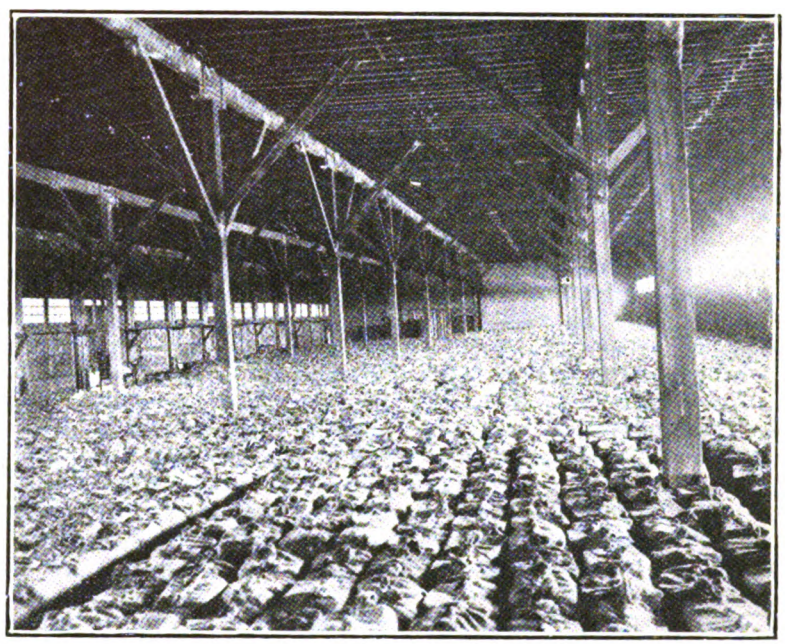
flying the flags of many countries are seen here

Arthur's tonnage has increased:

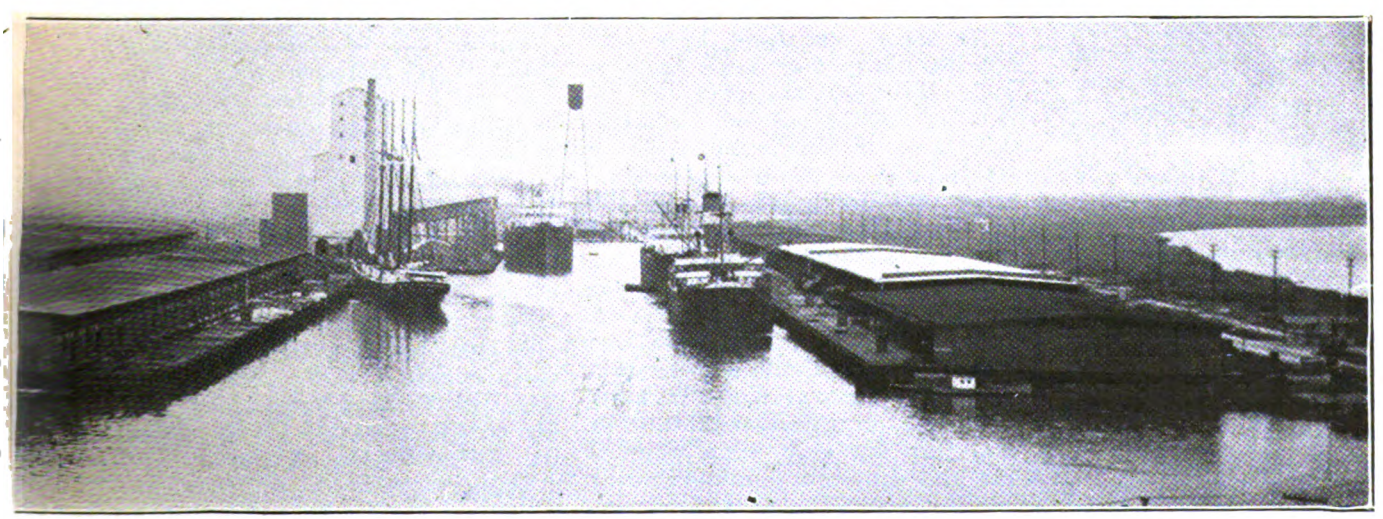
Tonnage Through Port Arthur, Texas	
1900	217,489 tons
1901	150,087 tons
1902	689,688 tons
1903	1,315,248 tons
1904	1,792,371 tons
1905	1,779,954 tons
1910	1,674,316 tons
1915	4,533,864 tons
1920	7,494,260 tons
1925	8,492,498 tons
1926	6,301,831 tons

It would seem from the 1926 figures that Port Arthur decreased in tonnage for that year, but this is due to a revision of the customs district, giving to other ports that tonnage which formerly was credited to Port Arthur, when, as a matter of fact, the tonnage really increased, with the Sabine district handling over 16,000,000 tons in 1926.

John W. Gates began where Arthur E. Stillwell left off and did perhaps more than any other one man toward getting Port Arthur well started in its growth into a metropolis. Legend has it that John W. Gates first came to Port Arthur to hunt ducks. He also was interested in oil, and while shooting ducks, which abounded, and still abound in the marshes on the waterfront, he decided that this was an ideal location for a great oil refining center. Spindle Top was booming, and at that time was the greatest oil field the world had ever known. Again the foresight of genius was



Cotton-seed Cake and Meal in shed at Port Arthur, Tex. Docks



shipping port—Ample space between piers with covered sheds

justified. Today Port Arthur is the largest oil refining center in the world. In the plant of the Gulf Refining Co., it has the largest oil refinery in the world—a giant industry having a capacity of 105,000 barrels a day and employing some 7000 men. In the plant of The Texas Co. Port Arthur has another refinery that ranks among the larger refineries of the world. Several other refineries of considerable consequence are located in the Port Arthur territory.

Arthur E. Stillwell saw the vision and John W. Gates caught the spirit of opportunity and stayed to make the dream come true. The end is not yet.

Port Arthur is a new city, a progressive city and port, with a land locked harbor 19 miles from the Gulf, with 30 feet of water all the way, affording every opportunity for industry and individuals seeking steady and profitable employment. Port Arthur is served by the Kansas City Southern railway, the Southern Pacific railway and the Eastern Texas Electric Interurban railway. A permit has recently been granted the Waco, Beaumont, Trinity and Sabine railway to extend their lines into Port Arthur. Construction of this project will be completed before the end of 1929.

The Port Arthur Canal and Dock Co. operates every known facility for the speedy and efficient handling of water-borne cargo, including a 500,000 bushel grain elevator, 7000 lineal feet of wharves and 5000 feet of warehouses which range from 70 to 100 feet in width.

An examination of Port Arthur's increase in commercial and industrial activities together with its potentialities as one of the greatest of American seaports in the short span of less than a century very clearly indicates Port Arthur's importance.

Mechanical Stokers for Marine Jobs

THE great interest aroused by the reading of two papers on pulverized coal tests at the last meeting of the Society of Naval Architects brought out the fact that some work has been done in developing mechanical stokers for firing coal in boilers on board ship. The advance made along this line and the excellent results obtained were brought to the attention of the members in discussions submitted by Carl J. Lamb, member and Donald J. Mosshart, visitor. Modernizing the boiler room on board ship is of vital importance and the mechanical stoker represents a successful method of doing so. Mr. Mosshart's discussion is therefore of more than ordinary interest and is reprinted herewith in full.

Discussion by Donald J. Mosshart

These papers have been tremendously interesting to all of us, I am sure, and I think the individuals who were so active in acquiring this information and placing it before us are repaid better by the amount of success they have had than by any praise that we might give them here. All of us who are actively engaged in beating old Mother Nature in the burning of coal know the feeling of warmth that comes to us when we attain success.

However, a few things came to my mind as I read over the papers, and also as I read over some contemporary information on pulverized coal, on which I should like to comment. These two papers present two different figures for the power required to grind coal. One of them is low. I think that is because they have a coal which is unusually friable. The other is a very representative figure. The figures obtained on land for pulverizing coal in small-sized installations run somewhat in excess of the figures given in these papers, and it is fairly well established by such bodies as the National Electric Lighting association that you can't pulverize coal in small installations for much less than 50 kilowatts per ton. If you forget all about heating your feed-water with the exhaust steam of the turbine, and that sort of thing, and take a kilowatt as being a kilowatt, made in the most economical way you know how to make it, there is a power consumption equal to a loss in efficiency of 3½ per cent.

The character of the ash in the furnace is influenced by furnace temperature. I think it is fairly well established in land practice that you must have a hot furnace to get economical combustion in a small space. Consequently, if you try to hold furnace temperatures down to accommodate the ash you are going to knock your efficiency down.

The coals that have been used here have been high grade coals. I don't believe that this particular variety of high grade coal is available to all marine installations and I think that, especially on the Great Lakes, the quality of coal is such that the excellent results obtained here will be hard to secure.

Every kilowatt that is going through these lamp bulbs here is made by stokers. Stokers have been tried on marine installations in years gone by. Twenty years ago we heard of stokers on marine work—that is, chain grates. They were more or less of a failure, and out they went.

Today it is nip and tuck between stokers and pulverized coal in largest plants on land. In a small installation there is no nip and tuck about it. The stoker has it all over pulverized coal in a small installation.

The stoker industry has advanced so much in the past five years that there is even a bigger contrast in it than there is in the pulverized coal industry. We dont' appreciate it, most of us, because it has been

(*Continued on Page* 38)

Donald J. Mosshart is assistant chief engineer of the stoker department, Westinghouse Electric & Mfg. Co. at South Philadelphia.

November Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of November as follows:

Lakes	Feet above mean sea level
Superior	602.54
Michigan-Huron	578.91
St. Clair	573.78
Erie	571.11
Ontario	244.85

Lake Superior was 0.19 foot lower than in October and it was 0.85 foot higher than the November stage of a year ago. Lakes Michigan-Huron were 0.19 foot lower than in October and they were 0.65 foot higher than the November stage of a year ago. Lake Erie was 0.21 foot lower than in October and it was 0.36 foot lower than the November stage a year ago. Lake Ontario was 0.14 foot lower than in October and it was 0.39 foot lower than the November stage of a year ago, and 0.44 foot below the average stage of November of the last ten years.

A large single section, wood drydock building for the Jersey City Dry Dock Co. was launched on Dec. 11, at the plant of the American Car & Foundry Co., Wilmington, Del.

This drydock is 216 feet long and 75 feet wide. It has a capacity up to 1500 tons.

Seattle's New Fireboat at Home Port

Seattle's new steel fireboat, ALKI, built at Oakland, Cal., by the Pacific Coast Engineering Co. has arrived at her home port and is now in commission. This vessel was designed by W. C. Nickum, Seattle naval architect, formerly connected with the Todd Dry Docks, Inc. The new vessel is 123.6 feet in length, 26 feet beam and 11.6 feet in depth. She has a maximum speed of 18 knots and is propelled by seven 350 horsepower Winton engines. Six of which are connected with centrifugal fire pumps. Her maximum capacity is 17,000 gallons per minute. The vessel is also equipped with wrecking pump and other salvage accessories.

All the hydraulic equipment in connection with the hydraulically operated monitor tower has been furnished by the Allan Cunningham Co., Seattle, this being an entirely new feature in fireboats. Other parts furnished by the Cunningham company are the hydraulic steering gear, electric boat hoist, electric anchor windlass and a large Cunningham whistle. The hydraulic system aboard this vessel is the invention of Mr. Cunningham. The same firm is also furnishing equipment for the three fireboats being constructed for the city of Portland by the Baker Construction Co., of that city.

Ship Autos Uncrated

When the steamer EBERSTEIN sailed form New York on her maiden voyage, she carried a Christmas cargo composed entirely of American automobiles bound for Europe. The ship has been chartered by the Studebaker Corp.

The EBERSTEIN carried what is thought to be the first shipment of its kind on record, for the 500 Studebaker and Erskine automobiles that constitute her good cargo were all shipped unboxed. Shipping cars in this manner has been an accepted practice for some time on passenger steamers carrying cars for tourists, but heretofore it has not been possible to make large shipments of passenger cars to foreign dealers without boxing. It represents a big saving.

American-Hawaiian Co. Coast-to-Coast Carrier

The receipt of one of the more than 60,000 calendars for the year 1928 sent out by the American Hawaiian Steamship Co. is a good occasion for recalling the age and the high reputation for courtesy and effective service of this intercoastal steamship company whose endeavor it has always been to build up and to hold the goodwill of those with whom it has dealings.

The American-Hawaiian Steamship Co. is the oldest of the coast-to-coast carriers; dating back to a line of California clipper ships established in 1855 to provide a scheduled service around Cape Horn. This line was finally merged in the present company, which was incorporated twenty-nine years ago to operate a fleet of steamers through the Straits of Magellan, and which took its name from the fact that until the beginning of the war the company's steamers made regular calls at Hawaii for sugar cargoes.

(*Continued on Page* 38)

Steam Lighter is Converted to Diesel

MARINE men interested in New York harbor shipping are witnessing the steady growth and adoption of the diesel engine in all classes of harbor craft. There are, at present, a large number of diesel tugs and ferries, as these vessels utilize their power on either 12 or 24-hour basis and the resultant economies of the diesel engine permit paying off the initial investment within two to four years. Lighterage concerns have as yet hardly begun to appreciate the economy to be effected with the diesel engine.

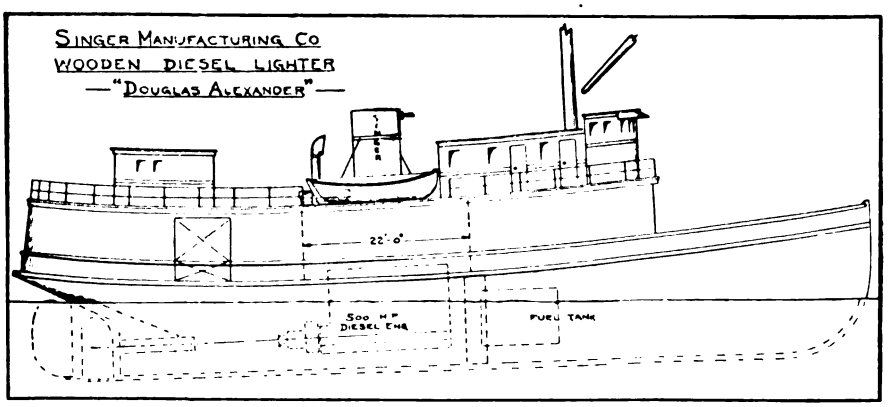
The average deck lighter, if used for example on a 12-hour basis, spends possibly four to five hours in running, and the balance of the time loading or discharging cargo. These long lay periods are interrupted with shifting the vessel from pier to pier, to facilitate handling the freight. It is consequently necessary to maintain sufficient steam pressure at all times, resulting in considerable coal consumption. The diesel engine is particularly adapted to lighterage service, as no fuel is consumed at the dock, although the engine is ready for immediate operation for maneuvering the vessel.

An interesting lighter conversion from steam to diesel power, is the DOUGLAS ALEXANDER, owned and operated by the Singer Mfg. Co., Elizabethport, N. J. Her dimensions are: length, 107 feet 6 inches; breadth, 38 feet 6 inches; depth 10 feet 6 inches.

A diesel engine of 500 horsepower built by the New London Ship & Engine Co., Groton, Conn., is being installed and it is expected that a speed of 12 to 13 miles an hour will be obtained. The engine is of the six-cylinder, mechanical injection, four-cycle direct reversible type. Operating controls will be so arranged that maneuvering may be carried out from either the main deck level or the engine room floor.

The accompanying sketch illustrates the DOUGLAS ALEXANDER, and the new arrangement with the Nelseco engine installed. The comparison with the original steam installation is interesting as it shows at once the small engine casing on the main deck, which directly increases the freight-carrying capacity and also the simplified auxiliaries below deck. The increase in deck space is highly desirable as the Singer Mfg. Co. uses the boat for delivering large shipments of sewing machines to the foreign steamship lines around New York harbor.

Eads Johnson, New York, naval architect, is in charge of the conversion work, which is being carried out at the W. & A. Fletcher plant in Hoboken. Prompt deliveries are being made on the machinery and installation work, and it is expected that the DOUGLAS ALEXANDER will soon be in service as a diesel lighter.



With the completion of the Tehuantepec National railroad in 1907, the company's fleet was divided into the Atlantic and Pacific units, and from then until the completion of the Panama canal in 1914, cargo was transferred across the Isthmus of Tehauntepec by rail. Except for the interruption of the World war, during which time its fleet was turned over to the government for war transport purposes, the American-Hawaiian has maintained a prompt and regular coast-to-coast service ever since the opening of the Panama canal, showing a steady growth year by year until now it operates a fleet of 23 modern motorships and steamers on a schedule giving shippers east and west bound sailings every four days.

The American-Hawaiian Steamship Co. played a very important part in the great war. Two of its vessels were of the first fleet of 13 ships to carry United States troops, supplies and horses to France, and all together, its vessels carried 125,499 troops and 625,641 tons of cargo over seas without loss of life and without a single delay or mishap except a broken rudder on the PENNSYLVANIA, returning light from France. This almost unparalleled record was due in part at least to an efficiency both in personnel and equipment which had been developed in times of peace under the stimulus of private ownership and operation without aid or interference from the government.

The present officials of the American-Hawaiian Steamship Co., which has played such a large part in the industrial growth of the West coast and whose progressive policy and high standards of service have been important stabilizing factors in the development of commerce between the two coasts, are Roger R. Lapham, president; J. D. Tomilson, vice president; J. E. Cushing, vice president and traffic manager; T. G. Plant, operating manager; and W. J. Mahoney, secretary and treasurer.

Improve Buffalo Harbor

The city council of Buffalo has accepted the recommendations of the harbor improvement committee which provide that the harbor shall be divided into three zones; one for passenger terminals, a second for industrial terminals, and a third for recreational development. Jurisdiction over the improvement will rest with the city council. The suggestion that the Ohio basin and the line of the Erie canal from Wilkeson to Vermont streets be abandoned was not approved.

Mechanical Stokers

(*Continued from Page* 36)

with us so long; we don't pay much attention to it.

You can put a stoker in a boat. You can put it in a small combustion space. The coal burns in solid form on the stoker. What doesn't burn on the stoker goes up into the furnace in the form of gas, and it stands to reason that you can burn gas with turbulence a great deal easier than you can burn solid particles flying around the furnace. Therefore, it is evident that you can use a smaller furnace volume for the same combustion results if you burn solid fuel on the stoker and gas in the furnace atmosphere than you can if you burn all the fuel as solid particles in the furnace atmosphere.

All that remains to be done is to go about the problem in the scientific manner in which the pulverized coal people have gone about it. We haven't done that. The stoker manufacturers have not seen a margin of profit, considering available market, responsibility and all, large enough to really warrant a lot of interest being taken in marine stokers. Today I think the situation is different. The marine people, in common with the land people, are looking for something better than what they have, and some stoker manufacturers at least are ready and willing to go along with them.

You take a stoker and put it on a boat, and what do you get? You don't have to worry about maneuvering. If the pilot rings for a dead stop or full speed astern, and the steam pressure goes down, you have a bank of coal available and when you want steam all you have to do is pull your turbine valve open on your stoker and fans. There is no juggling with burners and air currents. You don't have to worry about whether your fire is going out or not. You don't need to worry about air proportioning because in the mechanical supply of fuel and the design of the grates, the air supply is taken care of and it doesn't rely on control by firemen.

You have capacity. You can burn 40 or 50 pounds of coal per square foot with economies that are duplicates of the pulverized coal economies reported here today. For your running range you can put in a stoker that is big enough to have a moderate combustion rate and then you have all kinds of reserve. If you lose a boiler, you don't have to worry about combustion space; for running the other boilers at overloads the stokers don't need it.

Your coal character problem is eliminated, because stokers that have been developed on land burn any kind of bituminous coal. I am not talking about anthracite or lignite. Any kind of bituminous coal whether the ash fuses at 1800 degrees or 2800 degrees, or whether it is 13,000 or 9000 B.t.u.'s, is burnt successfully on stokers, and you can get as much horsepower out of a properly designed stoker whether the coal is 14,000 B.t.u or 10,000. That has been demonstrated.

I have been intruding here, at a pulverized fuel discussion, to talk about stokers. The remarks are possibly out of place at such a meeting, if so, please accept my apology. Before retiring I would like to call your attention to the fact that, since August, 1927, there has been in service on the Great Lakes a 15,000-ton limestone freighter, the CARL D. BRADLEY, having 2 Babcock & Wilcox boilers fired by central station type stokers. While the testing facilities have not been of the best it is indicated by all the data we can get that the efficiency is around 83 per cent. The regular schedule is maintained, and there is ample capacity above the requirements.

Geared Turbines Reliable

(*Continued from Page* 27)

large fighting vessels, quadruple shafts driven by turbines through exceedingly large gears, partly manufactured by the same company and partly manufactured by Mitsubishi Zosen Kabushiki Kaisha to the flexible frame design, and which have been operating without trouble and with entire satisfaction for a number of years.

To all engineers the record installation and operation of the propulsion unit of the S. S. TOHSEI MARU, especially in view of the circumstances immediately preceding the erection, and because of the ease with which the equipment has been so well operated and maintained by a personnel which has had no aid, service or instructions pertaining to any of the American-built equipment, is of more than usual interest. Such an installation of American-designed and built apparatus, made on the other side of the world by a people entirely unacquainted with the details, erection and operation of the geared turbines illustrated, aside from being an index of proper and reliable design, calls attention to the ability and efficiency of the Japanese mechanics and engineers responsible.

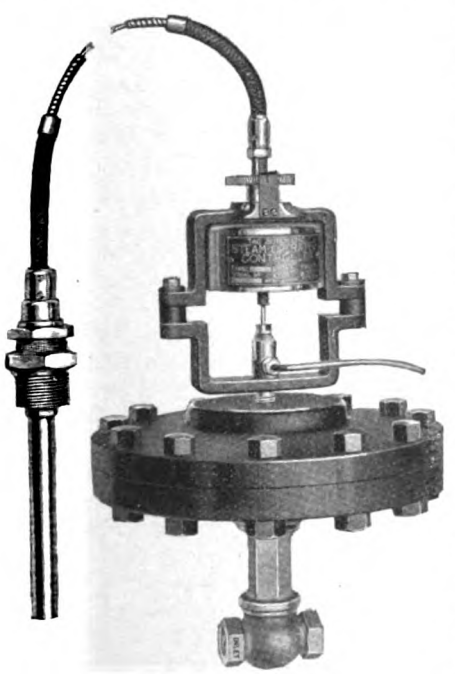
Equipment Used Afloat, Ashore

A Steam Operated Temperature and Pressure Controller—Electric Log—Portable Electric CO_2 Meter—Air Driven Hand Saw

A STEAM operated controller of temperature and pressure has recently been perfected. Temperature and pressure controllers, regulators and thermostats have been made in many different forms, principally of the self-operating and the air operated type. Of the two latter the air operated type is in more general use where accurate control of temperature and pressure is desired. Such instruments do give exact and dependable regulation but it is necessary to use compressed air to regulate the diaphragm-motor valve on the steam line. It is not always convenient to supply compressed air, and the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., decided to try to work out an entirely practical steam-operated controller.

After much work and many careful tests and actual installations this company now feels that its steam operated controller is a dependable practical instrument. There has been an insistent demand for a perfected steam operated control and the present device will supply this demand.

The steam operated controller which is shown in an accompanying illustration is simply an apparatus which utilizes a portion of the steam which heats a device to obtain enough power to work a valve the opening and closing of which governs the temperature to be maintained. The steam enters the diaphragm chamber through opening C, whether the steam valve is open or shut. There is also an opening B which connects the space above the diaphragm with the space below it and steam can flow through this opening but it cannot escape from the upper portion of the diaphragm chamber and the steam pressure is therefore the same above and below so that there is nothing to prevent the main spring from pushing down on the valve disk until it is closed. If the steam above the diaphragm is allowed to escape through an opening, A, larger than the opening B then the pressure above the diaphragm will be less than the pressure below. Under these conditions a sufficient upward force will be exerted to open wide the steam valve against the pressure of the main spring.



STEAM OPERATED CONTROLLER FOR TEMPERATURE AND PRESSURE

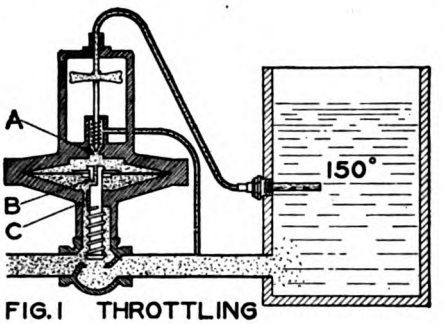


DIAGRAM SHOWING PRINCIPLE OF OPERATION OF STEAM OPERATED CONTROLLER

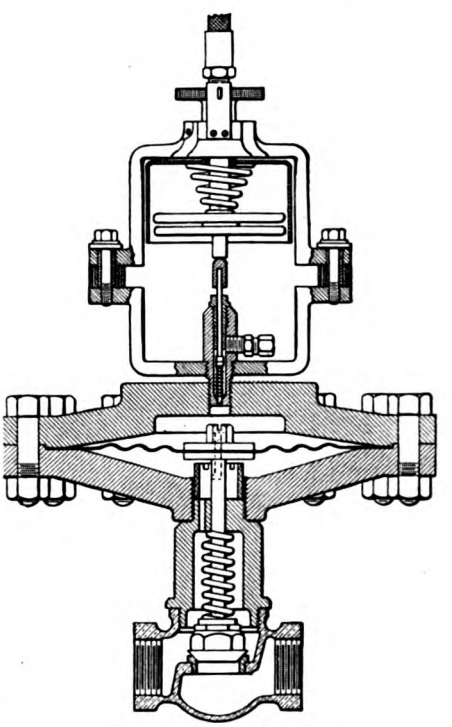
If the steam from the upper portion of the diaphragm chamber is allowed to escape at about the same rate as that at which it passes from below to above the diaphragm the differential pressure will be just sufficient to cause the steam valve to be "cracked" and will thus give throttling control.

The opening A is the governing point in the controller and it is here that a pilot valve is placed which requires an insignificant amount of force for its operation. This pilot valve is operated by a metallic bellows which forms a part of the usual thermostat system, that is, a sensitive bulb, connecting tube and bellows. The thermostat liquid in the sensitive bulb is partly vaporized and exerts a moderate pressure through the bellows on the pilot valve which is partly open as shown in Fig. 1.

The escape of steam from the upper portion of the diaphragm is such that the differential, opposed by the main spring, holds the steam valve at the correct opening. But when the thermostatic liquid in the bulb is almost entirely vaporized, through the bellows action a pressure is exerted sufficient to close the pilot valve, then the pressures above and below the diaphragm are equal. The diaphragm therefore is inoperative and the main spring closes the steam valve.

The third condition shows the liquid in the bulb not sufficiently vaporized to exert any pressure on the pilot, which is therefore open and allows the steam in the upper portion of the diaphragm chamber to escape faster than it can enter through the opening around the center of the diaphragm. The pressure below the diaphragm thus being greater, the steam valve is opened wide and allows the steam to heat the apparatus.

It is possible to adjust the instrument by a movement of the knurled dial in the direct connected type and the pointer dial in the wall mounted type. At any time in this way the setting point may be changed within the range of the controller.



CROSS SECTION OF DIRECT CONNECTED TEMPERATURE CONTROLLER

This device has numerous marine applications among which may be mentioned for temperature control the following: Hot water service tanks; surge tanks; fuel oil storage tanks; fuel oil preheaters and for de-aerators or evaporators. It may also be used for pressure control in de-aerators or evaporators and for pressure controllers in the case of fuel feed for stoker engines or fuel oil pumps. A controller of this type may be used to control the temperature of feed water heaters when the turbine bleeder line is at constant pressure; and as a pressure control when the turbine bleeder line is not at constant pressure.

An Electric Ship-Log With Remote Receiver

It is an important matter to the ship master to know with the greatest degree of accuracy the distance covered by his vessel for any given period of time. Dead reckoning though it is not nowadays depended on entirely to fix a ship's position is still a most important check in navigation. Thos. Walker & Son, Ltd., Birmingham, England has specialized for many years in the development of instruments to aid the navigator in determining the distance run.

The latest instrument for this purpose turned out by this manufacturer is the electric ship-log. The distance covered as shown by the log register is electrically recorded in the chart house and in any other part of the vessel as desired. The officer of the watch is thus able to take the log readings at the same time as he consults the chart. In foggy weather this is of course, of special merit.

The log will work off the ship's lighting circuit, the current being taken from the nearest convenient circuit. When no generator circuit is available the electric log may be operated by current from a set of batteries.

Location of the log may be on the taffrail and tow astern or on the bridge rail and streamed amidships in conjunction with the Viking ship-log connector. From either of these locations a flexible electric cable is connected by means of a watertight socket connection from which the cable is run to a resistance box or to batteries and then connected up to the chart house receiver. As there is a complete electric circuit between the log register whether it is located on the taffrail or the bridge rail, the chart house receiver will indicate the exact speed shown by the instrument.

This is made possible by an electric contact making devise inside the log register so constructed that an electric contact is made every tenth of a mile, thus causing the chart house receiver to record the same distance as that shown by the register. The contact is uniform and cannot be repeated by vibration no matter how violent. The amount of current required to operate the log is one tenth ampere and as the internal resistance is only forty ohms, additional resistance must be included in the circuit for all pressures over 10 volts.

When it is intended to run the log off the ship's circuit the complete outfit includes an ironclad double pole resistance box which can be arranged to suit any voltage on board. The voltage it is intended to operate on should be given. The Viking connector mentioned above as necessary when the log register is fitted on the bridge rail was described in MARINE REVIEW, September, 1925, page 334.

Electric CO_2 Meter Easily Portable

The instrument is shown in the accompanying illustration; the dimensions of the case are 6½ inches x 7½ inches x 9 inches and weighs 14½ pounds. It consists of a precision profile indicator at the top, below which is arranged from left to right, the bridge zero adjuster, a tumble switch and the variable resistance for current adjustment. To set the proper bridge current, the tumble switch is thrown into the upper position, this cuts the precision indicator into the circuit as an ammeter and the current is set to the top mark deflection by means of the variable resistor. Three standard dry cells are used as the current source and connected to the two binding posts in the lower left hand corner.

A PORTABLE ELECTRIC METER FOR DETERMINING CO_2

When making temperature measurements, the tumble switch is thrown into the downward position, any standard thermocouple can be connected to the lower right hand terminals and the reading made on the millivolt scale. By means of a millivolt-temperature curve the temperature is determined. This instrument is constructed by the Bacharach Industrial Instrument Co., Pittsburgh.

For the analysis of flue gas the tumble switch is thrown into the center position. The gas in sampled by means of a hand aspirator which draws the gas through a small calcium chloride and cotton filter, which when not in use is conveniently held in the cove of the instrument as shown. The instrument is guaranteed to have an accuracy of one-half of one per cent CO_2. It can also be arranged to give continuous indications for short periods (2 to 3 hours).

The advantages of this instrument over an Orsat or similar analyzing equipment are: Chemist or expert operator is not necessary; no liquids are required; the CO_2 is indicated instantaneously; a large number of tests can be made in the same time that it takes to make one Orsat determination; can be installed to function continuously for short periods without an operator.

Air Driven Hand Saw Portable and Safe

An automatic portable hand-saw, operated by compressed air and doing five times the work of an ordinary saw in the hands of a workman, has been devised by the Ingersol-Rand Co., New York. This saw, for use by shipyards, ship repair plants, railroads, building contractors, lumber yards, shipping rooms and other fields of utility, reduces sawing costs from 50 to 75 per cent below by the old hand-saw method. The accompanying illustrations show the saw in use at the Brighton Marine Repair Yard, Staten Island, N. Y.

By a mere shift of blades, the pneumatic hand-saw may be put to work in sawing wood, soapstone, Bakelite, wallboard, cables, copper, and other materials. Cross-cut or rip blades for different types of work are available. It cuts timber; does trimming

work on buildings and scaffolding; and it is used by shipyards in repair work. It is as adaptable in its applications as it is economical.

In sawing wood, the portable air-driven hand-saw can be operated 20 times as fast as a workman can ply his saw, and in this, as well as in all other work, it can be operated continuously without fatigue to the operator. Its weight is such that it can be easily carried about and handled

RIPPING 4-INCH PLANKING

by the workman. The 8-inch size weighs 23 pounds.

One outstanding feature of this new air saw is its safeguard against accidents. The design combines the Ingersoll-Rand 3-cylinder type of air motor, long in use for grinders and light-weight drills, with the Crowe safety saw guard. This guard has been officially approved by the Ohio industrial commission, by the Pennsylvania department of labor and industry, by the New Jersey department of labor; and by the Underwriters' laboratories.

CUTTING OUTER PLANKING

The safety guard is of a telescopic nature. It opens when the saw is applied to the material; and it automatically closes and locks in position as the cut is completed. It affords complete protection against accident or damage to the blade. The saw guard has an adjustable stop so that the saw can be set for the required depth.

Auxiliary Requirements

(*Continued from Page* 32)

to design and two-cycle operating features applies in all respects to the two-cylinder 18-kilowatt machine installed for lay-up lighting service. It has a smaller bore and stroke and turns at 800 revolutions per minute.

The electrical end of the diesel generators are also Fairbanks-Morse products, a fact which concentrates responsibility for the complete units. They are direct-current machines with interpoles and compound windings capable of giving a voltage regulation far in excess of the demands met with in this service. Their characteristics are such as to permit of their being paralleled with ease.

Great care has been taken to make these generators fully capable of operating in marine service. They are completely protected against spray by enclosed construction, yet positive ventilation is assured by numerous fan-blades of large area fastened to the engine flywheel. Air is drawn in through a guard near the top of the casing, the form of the guard being such as to deflect almost any quantity of water that may fall on the unit. Air is forced through the field windings towards the commutator end and escapes through two grids in the lower part of the cone-shaped guard casing that surrounds the commutator and outboard bearing of the machine. In addition to the two lower grid openings there are also two access holes of similar shape closed off with gasketed covers held down by screws especially designed for easy and quick manipulation. Removal of the covers immediately makes the commutator accessible.

Electric Controls

(*Continued from Page* 24)

pumps are totally enclosed and a blower is provided with a special automatic starter so interlocked with the automatic starters on the cargo pumps, that it is necessary to start and operate the blower motor for a period of 30 to 40 seconds before it is possible to start the cargo pump motor. This is for the purpose of scavenging the air in the cargo pump motors and removing any danger of an explosion due to sparking on the motor commutator should explosive gases accumulate within the motors. The fire and ballast pump which is driven by a 60-horsepower motor, is equipped with an automatic starter as shown in Fig. 5 on page 24.

The power for the electric auxiliaries is obtained from three 100-kilowatt diesel-driven generator sets. The diesel engines are three-cylinder, 150 brake horsepower, New London Ship & Engine Co. units operated at 250 revolutions per minute, driving 240-volt direct current generators. Two of these generators each have a magnetic clutch on the opposite end of the generator shaft, which when energized couples the diesel engine to a three-stage air compressor for starting purposes. The use of a magnetic clutch permits the same prime mover to serve both for the generator and for the air compressor since it is not required to operate either the air compressor or the generator at the same time. These illustrations indicate the flexibility possible in applying electric power to motorship auxiliaries.

Honor Admiral Plunkett

On Feb. 15, Rear Admiral Plunkett, commandant of the third naval district and of the New York navy yard, will retire from the navy because of the age limit.

On that evening a testimonial dinner will be held at the Waldorf-Astoria, New York city, which will be sponsored by a number of organizations and by individuals prominent in financial and industrial circles, including among others, James A. Farrell, president of the United States Steel Corp.; L. F. Loree, chairman of the association of railway executives; William Green, president of the American federation of labor; William H. Todd, president of the Todd Shipyards Corp.; William L. DeBost, president of the New York chamber of commerce; Brig. Gen. Palmer E. Pierce of the Standard Oil Co.; Hon. Lewis Nixon; R. A. C. Smith; Maj. Gen. Charles P. Summerall, chief of staff, United States army; Maj. Gen. William N. Haskell, commanding general, New York national guard; Maj. Gen. J. G. Harbord, president, Radio Corporation of America; and Brig. Gen. Cornelius Vanderbilt. Col. Edward A. Simmons, 30 Church street, New York city, is temporary chairman.

Reviews of Late Books

Studies in Naval Architecture, Strength—Rolling, by A. M. Robb, D.Sc. M.I.N.A.; cloth, 312 pages, 6½ by 9 inches, published by Charles Griffin & Co., Ltd., London and in Philadelphia by J. B. Lippincott Co., and furnished by MARINE REVIEW, Cleveland, for $12.00 postpaid and in Europe by the Penton Publishing Co., Ltd., Caxton House, London for £2 9s 3d.

The science of naval architecture serves as the foundation for the practical progress made in the building of ships. It is of utmost importance that the results of deep and intelligent study of the subject should be published so that it is available for all. A review of this important book devoted to a study of the important subjects of strength and rolling, should therefore be of particular interest.

The author is evidently a master of the theory involved and the subject matter of his book represents chiefly lectures delivered to university students. The same consideration which determined the choice of material and its arrangement for this purpose, we believe makes this work extremely valuable to practical engineers in arriving at a fundamental understanding of the underlying theory and its practical application to the proper design of ships. The book undoubtedly represents the individual attitude of the author toward various phases of the subjects discussed.

There are in all, fifteen chapters. Ten of these chapters are devoted to the question of strength. The remaining five are devoted to the question of rolling. A summary of chapter titles will give the reader a good idea of the scope of this book. These are as follows: The Structure of a Trochoidal Wave; The Ellipse of Inertia; Statical Shearing Force and Bending Moment; Shearing Force and Bending Moment Including the Effects of Heaving and Pitching; The Determination of the Stresses in the Structure of a Ship; The Deflection of Ships; Transverse Strength; Some Considerations of Local Strength; Attachments; A General Survey; The chapters on rolling are: Rolling in Still Water; Methods of Measuring Angles of Rolls and Stresses on Masts Due to Rolling; Rolling Amongst Waves; Model Experiments on Rolling; Means of Reducing Rolling.

The reader senses an authoritativeness in this work which we believe is fully justified. There are numerous illustrations in the way of diagrams dispersed throughout the text. The book is well printed on excellent paper. References are given to other works which have been consulted. It therefore represents not only an excellent treatise in itself but it is also a good bibliography of the subjects covered.

* * *

Motorship Manuel and Register of Motor Vessels, edited by A. C. Hardy, B. Sc., cloth, 288 pages, 7½ inches by 10½ inches, published by Motorship, New York and furnished by MARINE REVIEW, Cleveland for $3.00 postpaid and in Europe by the Penton Publishing Co., Ltd., Caxton House London for 15 shillings.

This fifth edition is enlarged and improved over previous editions. It contains a brief review of the advance in motorship construction. Many motorships are illustrated and described both American and foreign. The principal noteworthy motorships completed during 1926-27 including yachts and special types are illustrated and briefly described.

Another section of the book is devoted to instruction on the fundamentals of oil engines with questions and answers for engineers and students. There are also featured brief descriptions of all marine diesel engines of any note.

A number of articles are devoted to the description of auxiliary equipment used in connection with the operation of motorships. There is also a list of motorships which have been built from 1904 to and including 1926. These are given under the year which they came out. This book represents a very handy reference on the subject of marine diesel engines and their application.

* * *

The History of the Incandescent Lamp by John W. Howell and Henry Schroeder, cloth 208 pages, 5¼ by 7½ inches, published by the Maqua Co., Schenectady, N. Y. and furnished by MARINE REVIEW, Cleveland, and in Europe by the Penton Publishing Co., Ltd., Caxton House, London.

A very interesting book on that invention which has done so much to advance civilization during the present generation. In chapter I, the authors have briefly sketched the development of electric lighting prior to Edison's invention. Then follows a complete review of the work done by Edison leading up to his invention of a practical incandescent lamp and a complete lighting system and their commercial application.

In subsequent chapters are described at some length the development of filaments, researches into vacuum and methods of manufacturing in a practical way. In this section is included a description of leading-in wire development, glass construction and photometry.

As a complete book on the subject of the incandescent lamp this work will prove of interest to all who are appreciative of the wonders that have been evolved by man in the name of science.

* * *

Great Lakes Commerce and the Port of Oswego, N. Y. A report of an investigation made for the Oswego harbor and dock commission by Fay, Spofford and Thorndike, consulting engineers, Boston, in two volumes, cloth, 6 by 9 inches, published by the Oswego Palladium-Times Inc. and furnished by MARINE REVIEW, Cleveland for $10.00 postpaid and in Europe by the Penton Publishing Co., Ltd., Caxton House, London for £2 10s.

This is truly a monumental work, with the commerce of the Port of Oswego but a small part, of the entire commercial importance of the Great Lakes System and the possibilities for the future. It is rare indeed for such an extremely valuable investigation to be initiated by a single community and carried out by a trained engineering firm. Practically every feature of the commerce of the Great Lakes has been studied and is reported in this work. One volume is devoted to a detailed report of the survey. The other volume contains maps and tables especially prepared showing the direction and the amount of the commerce moved by water and rail. The economic features have been carefully studied. Statistics have been analyzed and intelligently appraised and interpreted so that a true picture is presented of the Great Lakes and tributary system of transportation.

Volume I has been divided into a number of sections, the first of which is the foreword and report. In this section is summarized with evidence of a great deal of research, the following: Commerce of the Great Lakes; water outlets from the Great Lakes; navigable conditions on the Great Lakes and their water outlets; shipping and ship operation; transfer facilities at ports; the railroads part in Great Lakes commerce; cost of transportation by water and by rail; the burden of railroad traffic and the need of new transportation

(*Continued on Page* 48)

Shipbuilding Compared

In a statement, which accompanied the introduction of his bill in congress having to do with the merchant marine, Representative W. R. Wood, of Lafayette, Ind. brings out these very interesting comparative shipbuilding figures:

"During the past five years there has been laid down or appropriated for and building a total of about 300 naval vessels, and of these Japan is credited with 101; France, 96; Italy, 46; the British Empire, 37; and the United States with about 19.

"Merchant vessels of 2000 gross tons and over for transoceanic service contracted for, built or building: out of a total of about 1000 ships, the British Empire has about 741; Italy, 91; France, 80; Japan, 71 and the United States, 18. In the matter of gross tonnage actually being operated, Soviet Russia trails the United States by the equivalent of only one 10,000 ton vessel.

"This is the picture of shipbuilding activities of the principal maritime nations since the United States agreed to the apparent desire for world naval disarmament."

Large Navy Program

Secretary Curtis D. Wilbur of the navy has submitted a proposal to congress for the building of 71 new navy ships at a total estimated expenditure of $725,000,000. Though the proposal does not so specifically state, it is described by navy officials as the first five-year increment of a twenty-year naval building and replacement program. The eventual expenditure under this program would be between $2,000,000,000 and $3,000,000,000. The proposal calls for twenty-five light cruisers at $17,000,000 each, nine destroyers at $5,000,000 each, thiry-two submarines at $5,000,000 each and five aircraft carriers at $19,000,000 each.

Secretary Wilbur said that the maximum expenditure for any one year during the program would be $185,000,000 and the minimum about $55,000,000 depending on the procedure to be followed after authorization by congress. In his proposal Secretary Wilbur calls attention to the fact that the director of the budget on Dec. 13, advised the navy department that the proposed legislation is not in conflict with the financial program of the President.

High ranking officers of the navy believe that approval of the program outlined above and the appropriation of the funds to carry it out would make certain a first-class well-balanced American navy that would compare favorably with the navy of Great Britain. It was also pointed out that approval of the program would strengthen the position of the United States at the 1931 naval conference to be held under the terms of the Washington navy treaty.

Drydock for Baltimore

The Maryland Dry Dock Co., Baltimore, is adding another floating dry dock to its repair yard equipment. This company's shipbuilding and repair yard at Fairfield, Baltimore is well known as an up-to-date yard. The present dry dock equipment consists of a 9000-ton floating dry dock of the Crandall sectional type. The dry dock which will be added is substantially a duplicate consisting of a five-section dock which has been located at Jacksonville for some years and to which one new section will be added. The Jacksonville dock was built from the same plans as the present dry dock but only five of the six sections were built.

The five sections are to be towed from Jacksonville to Baltimore. The new section will be built at the Maryland company's yard. Work of preparing the berth for the new dock is well underway. Plans for the new section are being furnished by the original designer of the dock, the Crandall Engineering Co., Boston. These dry docks are of a patented type which retains all the self-docking advantages of a sectional dock while also retaining all of the longitudinal strength advantage of a solid dock.

Bids on Colliers

On Dec. 22, it was reported, bids were to be opened for the construction of two colliers for the Berwind-White Coal Mining Co. Bids were received from eight Atlantic coast shipyards. It is said that these two vessels are to be the first new ships equipped with pulverized coal burning systems. At this writing the results of the bids are not known but it is expected that the contracts will be let on the basis of these bids just after the first of the year.

Order Placed for Ferry

The state of Michigan has placed an order with the Great Lakes Engineering Works, Detroit, for a new ferry to cost $325,000. This vessel will be added to the state's ferry line between the upper and lower peninsula across the Strait of Mackinac. It will therefore be possible to maintain an hourly service instead of one boat every hour and one-half when the season opens next summer, as there will be three boats on this line including the one for which the contract has been placed.

In many respects the new boat will be similar to those now used, except that the capacity will be increased from fifty to sixty automobiles. The construction will be of steel and the hull will be so reinforced that it will be possible to operate through at least eight inches of ice. Delivery is called for June 1. The new ferry will be 202 feet long and work has been commenced.

An interesting reconstruction job was done by the same shipyard on the two vessels now in operation in this service. Each vessel was both lengthened and widened. An account of this work appeared in MARINE REVIEW for July 1926.

Launch Lake Tanker

On Dec. 3, the tanker, ROBERT W. STEWART under construction by the American Ship Building Co. for the Standard Oil Co. of Indiana, was successfully launched at the Lorain yard of the builder. The new vessel was christened by Mrs. Robert W. Stewart, wife of the chairman of the board of the oil company.

When completed the tanker will be used for the transportation of oil products on the Great Lakes. Her complement will consist of a crew of 28 men. She is 400 feet long, 52 feet beam and 25 feet deep, and has a capacity of 40,000 barrels.

Members of the board of directors of the Standard Oil Co. of Indiana, officials of the American Ship Building Co., and a number of invited guests attended the launching. After the launching, a luncheon was served at the Union club in Cleveland. This is the first tanker built in a Great Lakes' shipyard since the war.

The launching party included Col. and Mrs. Robert W. Stewart, Dr. and Mrs. W. B. Burton, Mr. and Mrs. Robert A. McElroy, Mr. and Mrs. Edward J. Bullock, Mr. and Mrs. Robert E. Humphreys, Edward G. Seubert, Mr. and Mrs. Beaumont Parks, Mr. and Mrs. Allan Jackson, Mr. and Mrs. Amos Ball, Mr. and Mrs. F. T. Graham, Mr. and Mrs. C. J. Bardull, Donald Stewart, Mr. William Pullman and Mr. and Mrs. Robert B. Stewart, of New York City.

Formerly the J. H. SHEADLE, the steamer FRED A. BAILEY owned by the Forest City Steamship Co. was sold at Buffalo Dec. 1 by the United States marshal to the Cleveland Cliffs Steamship Co. for $225,000.

Personal Sketches of Marine Men

Theodore E. Ferris, Naval Architect and Marine Engineer

By E. C. Kreutzberg

INBORN aptitude, intense application, and the most diversified experience have made him a master naval architect and marine engineer. Theory and practice with equal understanding go into his designs.

LONG and intimate association with one of America's notable naval architects of an earlier day had an important bearing on the completeness with which he has mastered his profession.

TO HIS designs and under his supervision have been constructed the finest passenger vessels for the American coastwise service. Work is his main hobby, after which perhaps comes sailing.

THEODORE E. FERRIS, designer of the majority of merchant vessels which have been built in American yards since the war, is dean of a profession which has very few members, that of naval architect and marine engineer operating independently and without any affiliation with any shipyard or vessel operating company.

In the past five years a program of coastwise ship construction representing an investment of $50,000,000 to $60,000,000, has been entrusted to Mr. Ferris by leading steamship owners. This program included, for instance, the six ocean liners built by the Clyde Line for the Florida trade, the two new old Dominion Line ships, a big Porto Rico Line-West Indies boat, the Munson liner, MUNARGO, the four new Eastern Steamship Lines vessels, the two Red D Line vessels built for the South American service, and other big passenger vessels. He also has executed many important commissions for special freight boats, notably the fleet of 14 tankers for the Agwi Lines.

During the same period, Mr. Ferris has had charge of reconditioning nearly a dozen old ships, including, in some cases, complete re-engining and re-boilering, at a cost, for individual vessels, of $500,000 to $1,000,000.

As back-ground for his work, Mr. Ferris has had an unusual experience. This appears to be the result of a roving strain which kept him constantly on the move in his younger days for additional information and experience. He has worked in many shipyards, and has first-hand knowledge of every yard in the country. In addition, he has visited many important European yards.

Theodore E. Ferris was born at Stamford, Conn., in 1872, of French and English antecedents who originally settled in Connecticut in 1634. His early days at Stamford were spent on a farm close to salt water and he showed his leanings at that time by whittling out small wooden models of yachts. He sailed boats on Long island sound much of his time. At the age of 13 he built his first craft, a cat-boat 17 feet long.

Mr. Ferris went to school at the Greenwich academy, graduating at the age of 18. He started work at the plant of the Yale & Towne Mfg. Co. at Stamford. After a year and a half, he realized that ships were to be his life-work. Accordingly he went to work at a wooden shipyard at Stamford, there becoming familiar with the use of the adze and the broad-axe. He learned about snap-curve chalk lines and how to lay wooden vessels down in the mold-loft. He worked at this yard for a year and a half and then, at the age of 21, went to another wooden shipyard at Greenport, Long island, where he worked for about a year. By this time he had found in shipbuilding a response which inspired him with the determination to master every detail of the art. The young man rigged up a drawing board and other necessary equipment at his home and under these circumstances he learned the rudiments of drawing. H. C. Wintringham, who then operated the old Mumm's yacht yard in South Brooklyn, encouraged the young man by

letting him do drafting work at home after hours.

The way into the field of ship design thus being opened, Mr. Ferris went to work for Henry J. Gielow, who had an office in New York and was one of the foremost designers of all kinds of boats at that time, specializing on yachts. Mr. Ferris recalls that Mr. Gielow offered to pay him $3 a week to start. The young man figured that this would pay his commutation expenses but would not cover his lunches, and after Mr. Gielow heard the proposition he agreed to pay the young man at the rate of $4. For two years he worked for Mr. Gielow. Then he left to go to work with another noted naval architect of those days, George B. Mallory.

After about a year and a half as draftsman for Mr. Mallory, Mr. Ferris went to the Lakes. He spent about nine months with the Detroit Shipbuilding Co. Then he returned to New York and went with the man who was to crystalize his future career, A. Cary Smith, ship designing genius of his time. Mr. Ferris says that under Cary Smith he obtained his real technical training. Unfortunately there developed one of those misunderstandings, which have a bearing on human relations so that Mr. Ferris' association with Mr. Smith received an interruption. Mr. Ferris went to Baltimore and for a year worked at a yard there which built mostly wooden but also some steel ships. Next he went to the Electric Launch Co., Bayonne, and stayed there about a year. He recalls that he received a salary there of $1800 a year, which was considered good in those days.

Then he entered the employ of the Townsend & Downey Shipbuilding Co. He practically had charge of the construction of that company's yard at Shooters Island, and thereafter was chief constructor, having charge of the building and repair of all ships. Among other achievements, this yard at that time built the yacht METEOR which was designed by A. Cary Smith for the then Emperor of Germany. Mr. Ferris at this yard had his salary jumped to the unusual figure for those times of $3600 a year. The most valuable feature of his connection with this yard, however, was that it gave him a thorough experience in all details of steel shipbuilding. In the meantime, Mr. Ferris and Mr. Smith were seeing a good deal of each other, and in 1901 Mr. Ferris left Townsend & Downey to go back with Mr. Smith. The partnership thereupon became known as Cary Smith & Ferris. It remained such until the death of Mr. Smith in 1912. Since then Mr. Ferris has conducted the business under his own name but still retaining A. Cary Smith's name on his letterheads.

Designed the Fabricated Ship

In telling about the difficulties in getting confidence established, Mr. Ferris says that he had to work for quite a few years with the big shipowners before he could get one of them to entrust the design and construction of a large merchant vessel to him. He received from Charles Mallory of the Mallory Steamship Co., in 1907, his first commission to design a large merchant vessel. This later became the steamship BRAZOS, which still is in successful operation. Since then Mr. Ferris has received commissions from one line after another. In the years since he has done work for practically every important ship owning firm and has had vessels built in practically every important American yard.

Of Mr. Ferris' numerous distinctive achievements, that of outstanding importance is his connections with the so-called fabricated steel shipbuilding program of the United States shipping board. Mr. Ferris is regarded as the father of the fabricated ship. At the time Gen. George W. Goethals was appointed general manager of the Emergency Fleet Corp. in 1917, Mr. Ferris was overwhelmed with work in connection with the building of ships for foreign owners and had between 30 and 40 vessels under construction at that time in American yards. He was called in by Gen. Goethals and drafted as the technical head of the government's wooden and steel shipbuilding program. At that time the problem of establishing the shipbuilding industry on a production basis was receiving major attention. It was Mr. Ferris who designed the so-called standardized or fabricated steel ships which made it possible to engage the steel fabricating shops of the country in ship construction. This achievement is regarded as most unusual since it generally is accepted as a fact that no hide-bound or restricted mind would have departed to such a radical extent from orthodox shipbuilding methods. As a result of the work of Mr. Ferris, the country's structural steel industry was turning out ships on a regular production schedule basis at the time of the armistice. It is of interest to note that a great many of the fabricated ships built at that time still are in profitable operation.

Finer Ship Appointments Now

Mr. Ferris started his services with the government in April of 1917 and remained on this job until February of 1918. During that time he not only designed the ships for the fabricated shipbuilding program, but he also designed all other ships built for the shipping board and approved standard designs prepared by shipyards representing ships that previously had been constructed. He also coordinated all shipbuilding information so as to make it available to the many new shipyards then being erected all over the country. Many of these yards, as a result of the work of Mr. Ferris, were able to build ships successfully without having had any previous shipbuilding experience.

A feature of his work of late years has been the extent to which he has contributed toward the constant elevation of the appointments of travel by water. Many boats which are regarded as typifying luxury, speed and safety have been created by Mr. Ferris. He is particularly proud of the NEW YORK and BOSTON, which are operated by the Eastern Steamship Co. between those cities through the Cape Cod canal. These ships were built at great cost and represent a new standard of coastwire transportation, but they have been operated with entire success, both financially and physically.

Mr. Ferris has his headquarters at 30 Church Street, New York. He makes it a regular custom to work at his office until late in the evening, finding that is the time when he is less likely to be interrupted by outside calls. He does a great deal of traveling about the country, all in connection with his work. He makes occasional trips to Europe in connection with his business.

Mr. Ferris is a member of the technical committee of the American Steamship Owners association and the technical committee of the American Bureau of Shipping. He is a member of the advisory committee of the Massachusetts Institute of Technology, a member of the council of the Society of Naval Architects and Marine Engineeers, and a member of several committees on marine standards. He is a member of the New York yacht, Larchmont yacht, Horseshoe Harbor, New York Press, Engineers and other clubs.

Reviews of Books

(*Continued from Page 42*)

routes; economic value of the Great Lakes compared with the cost of their improvement; Welland ship canal—the key to new traffic routes; future changes in trade routes; Oswego, the logical eastern United States lake port; and port development proposed at Oswego and its economic value. Elaborating on this report are appendices; A. Commodity survey of Great Lakes freight traffic; B. Commodity survey of New York state barge canal freight traffic; C. Transportation charges; D. Great Lakes navigability; E. Great Lakes shipping and ship operation; F. Welland canal; G. St. Lawrence river; H. New York state barge canal; J. Railroads; K. Oswego, past and present; L. Future commerce of Port of Oswego; M. Future industrial development of Oswego; N. Proposed development of port of Oswego and benefits resulting therefrom; O. References.

In these various divisions of the appendix references are made to tables and plates in Volume I. It is an exceptionally complete and carefully prepared report presented in so clear a manner that anyone interested may go directly to the particular subject he has in mind.

The harbor and dock commission of the city of Oswego, N. Y. which has made the publication of this book possible deserves commendation for the initiative and the vision displayed. The engineers, Fay, Spofford and Thorndike who have carried out this work also deserve great credit for the faithful and skilful manner in which the work has been done. The survey required more than two years of exacting research and the work as it progressed became unique of its kind at least in the Great Lakes region. It is felt by the harbor and dock commission at Oswego that this work will be of value to commercial interests of the lake region and that it constitutes a source of authentic and useful information. This survey and report is made available for distribution through the interests of the people of Oswego who have expended more than $25,000 on this project. It is believed that this work will further the cause of water borne transportation and consequently the prosperity of the United States.

The passenger season between Detroit and Cleveland closed with the sailing of the steamer CITY OF CLEVELAND of the Detroit & Cleveland Navigation Co. from Cleveland to Detroit on Nov. 29.

Smoke Prohibited by Ordinance

THE city of Cleveland like other cities of the Great Lakes is making a definite effort to eliminate as much as possible the smoke nuisance. For a great industrial city this is a difficult problem. To carry on this work a division of smoke inspection was organized and Elliott H. Whitlock was appointed commissioner. Cleveland being one of the major ports on the Great Lakes has had to contend not only with smoke from its industrial establishments but from the smoke thrown off by a large fleet of bulk freighters, passenger vessels and all types of craft.

Throughout the past navigation season the smoke commissioner's office has made some progress in reducing the smoke from vessels in the harbor and in the Cuyahoga river. This work has been carried out by E. L. Lannert, deputy smoke commissioner. Commencing in the latter part of April, visits were made to the different vessels laying in port. From these visits information was obtained concerning the boilers and method of firing and any other details which might have any connection with the making of smoke. In this way there was established direct personal contact between the division of smoke inspection and many of the engineers.

This preliminary work laid a good foundation for the co-operation of the respective engineers in an effort to reduce smoke. Though there was much differing opinion in regard to the possibility of complying with the smoke ordinance it generally resulted in the reasonable attitude that the city would expect each vessel to do as well as possible with the equipment and the coal on hand.

In June, 60 observations were made. The average duration of dense smoke was 7.9 minutes after every firing period. In October from one-hundred sixteen observations made of boats in the harbor the duration of dense smoke after firing had been reduced to 4.1 minutes. This represents an average for all fleets. Such companies as the Cleveland Cliffs Iron Co. and the Hutchinson fleet showed a reduction to between 2.2 and 2.8 minutes of dense smoke after firing.

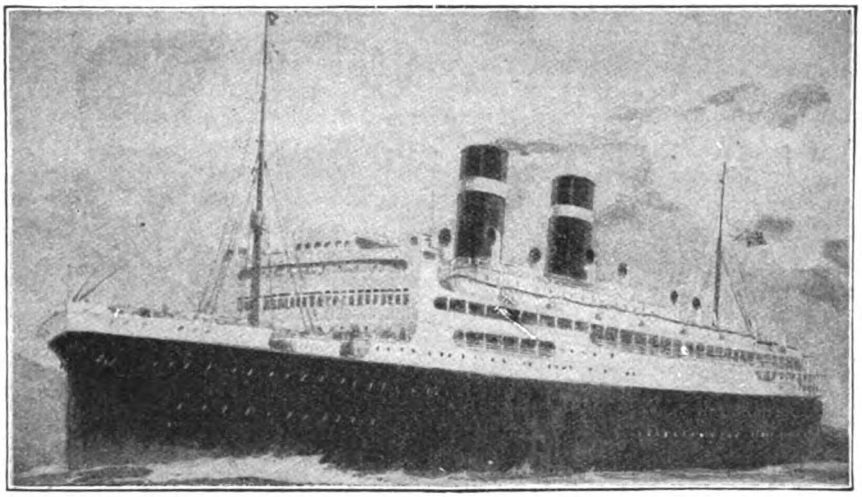
In the work carried out by the division of smoke inspection of the city of Cleveland certain methods of firing to reduce smoke have been developed. That is, firing methods were developed by practical trials on different types of ships which showed that such methods were helpful in the elimination of smoke. A summary of these methods has been written down and copies made. An attempt has been made to give each engineer a copy of these instructions for firing, and they can be obtained by any engineer by addressing Elliott H. Whitlock, commissioner, division of smoke inspection, City Hall, Cleveland.

It is important that each engineer should do his best to comply with the city ordinance against smoke. Deliberate carelessness on the part of engineers will subject the owner of the ship to a fine but it will be found that the department is very anxious to co-operate in a reasonable and practical manner with the engineers of the ships for the purpose of reducing the smoke nuisance to a minimum.

Channel Construction Used for Barges

A contract has been let by the United States engineering corps. Milwaukee, office for two barges to be built by the Manitowoc Shipbuilding Corp. These barges are to be built under the Ellis channel system of steel hull construction and are for use on the Fox River, Wis. These barges measuring 80′ x 26′ x 5′ have a spud well in center line at each end. Six yards quoted on plate construction, three of which also bid on channel construction. The average price for plate construction was $23,710 and the average for channel construction was $21,936.

Another barge is also being built under the Ellis channel system of steel hull construction by the Wallace Bridge & Structural Steel Co. for the Pacific Telephone & Telegraph Co. This vessel, measuring 100 feet x 40 feet x 12 feet is specially designed for carrying a large cable reel which weighs about 200 tons, at midship point of hull. This barge is completely equipped with steam hoisting machinery on deck and extensive quarters for the crew below deck, where also is the engineer's workshop and small diesel engine and generator for lighting and other purposes.



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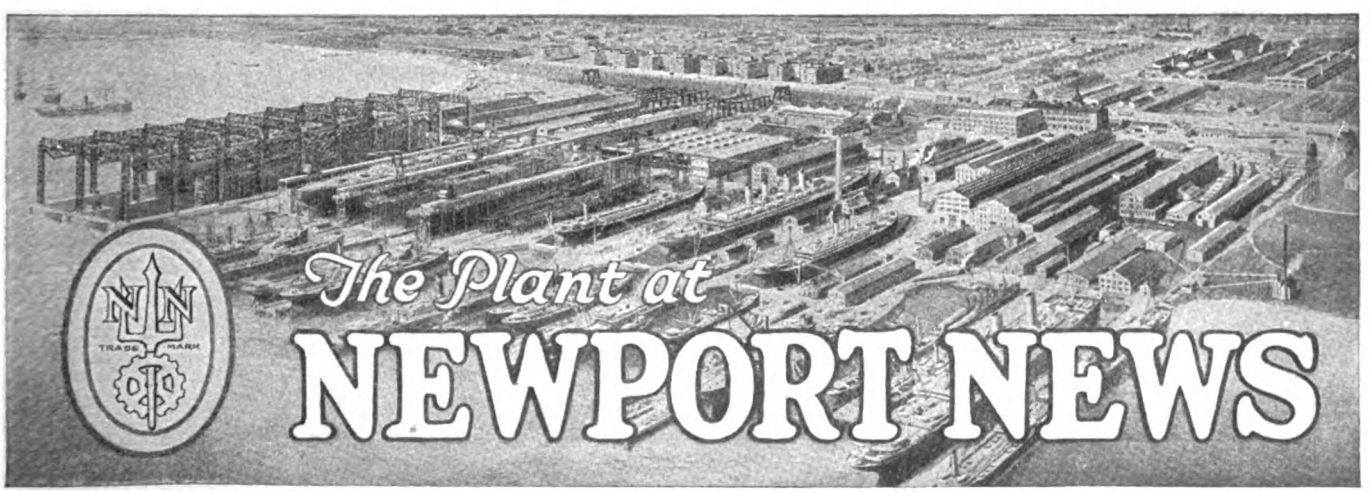

Will Congress Help

(*Continued from Page* 13)

move from the registry of commercial tonnage those ships unnecessary for the maintenance of lines of transportation service already established. The second major proposal of the bill relates to the construction of new vessels and the third proposal contained in the bill relates to the establishment of a merchant marine training school.

"The principal reason American owners find foreign competition so difficult is due primarily to the difference in construction costs," said Representative Wood, discussing with the writer that part of his bill which relates to new construction.

"I do not bemoan the fact," said he, "that it does cost more to construct a vessel in the United States, for American wages, standards of living, and general welfare are much higher than in foreign countries. It follows then that in custom work as compared with mass production the costs will be greater. A careful analysis of all factors entering into the construction and maintenance of vessels convinced me that the proper way to place American owners on a parity with foreign operators was to enable them to obtain a new vessel at a cost nearly equal to the cost of a ship constructed in foreign yards, and some means had to be devised to overcome this construction differential.

"It would not be proper for the government to absorb this difference or any portion of it, unless some return either in service or money was guaranteed. Inasmuch as an operator may borrow from the government a portion of the cost of the construction of a new vessel, the only feasible way to extend aid to the operator is at the time of construction. My proposal is that when the shipping board is furnished with copies of contracts entered into by operator and shipbuilder, indicating that they are ready to proceed upon the construction of a new vessel, the board shall enter into contracts with each of the parties, receiving from the operator a guarantee that the newly constructed vessel will be maintained in a stipulated service for a term of not less than ten years. This guarantee of service is the government's requirement for the interest it shall have in the vessel, which is to be provided in the contract with the shipbuilder, whereby the government undertakes to pay for so much of the cost of labor and material as may be in excess of the cost for like items entering into the construction costs of a similar ship in foreign countries. In other words, the government is willing to undertake a portion of the cost of construction in return for a guaranteed service for a term of years. A recapture provision will enable the government to resell or operate until satisfactory resale can be made of any service in default. Under this proposal the cost to the government is ascertainable at once, and the total cost in any one year will be much less than is being expended at the present time under government operation of the merchant marine."

The merchant marine plan of Edward N. Hurley of Chicago is causing considerable interesting comment by various members of congress. As is already known, under this plan congress would create a revolving fund out of which loans at 2.5 per cent interest would be made to ship builders. This is being mentioned by congressmen as one of the most comprehensive plans yet advanced for a United States merchant marine privately owned and operated.

As pointed out before the President is adamant against public ownership. He insists that the government should sell the rest of the big fleet it built during the war and get out of the shipping business. Naturally by reason of this view, he is opposed to new construction of merchant vessels by the shipping board. The situation as it now stands in congress and at the White House has been set forth above and it now remains with the gods to see what action, if any, is to be taken.

Diesel Engine Plant Receives Orders

A report has been received from the Washington Iron Works, Seattle, builder of the Washington-Estep marine and stationary diesel engine, that business in diesel engines is good for this time of the year. There are additional orders in sight and the outlook for further business is distinctly encouraging.

Orders in hand include five new engines for local off-shore halibut fishing boats, five special high speed 110 brake horsepower engines for electric generating auxiliary units for the United States coast guard cutters, Nos. 45-49; one 200 brake horsepower, direct reversing engine, for a new Alaska patrol cruiser building for the United States bureau of fisheries; two medium size engines for new British Columbia fishing boats; one 800 brake horsepower engine for a new ferry boat for the Kitsap County Transportation Co.

There was recently delivered a 180 brake horsepower, 4-cylinder, 11½ x 16 inches engine to Capt. John Gabelich, president of the Fishermen's Cooperative association of San Pedro, Calif. for a new boat called the MARIE JOAN which he had built at Tacoma. This vessel built of wood is 78 feet long by 19 feet 2 inches wide and 8 feet deep. She made a trip down the coast to San Pedro in heavy weather but came through in good shape. The trip from Cape Flattery to San Pedro was made in 114 hours which included 10 hours during which she was hove to to ride out of a storm.

Books for American Sailors

FRANK C. MUNSON, president of the Munson Steamship lines, makes his contribution to the sailors' library. This huge "book" in the Pennsylvania railroad station, New York, is the unique method used by the American Merchant Marine Library association to appeal to the public. Filled with volumes the giant book is donated for the floating library.

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Electric Propulsion

(*Continued from Page 25*)

The propeller-shaft thrust bearing is of the spring-thrust type, and electro-hydraulic steering equipment is used.

In addition to the main generators, there are two auxiliary generators mounted on shaft extensions of the main units and three independently driven auxiliary generating sets. They supply current for the operation of 22 motor driven auxiliaries, and for lighting.

Four large double-end diesel electric ferryboats were completed for the Southern Pacific Co. for service in San Francisco bay.

Other Diesel Electric Units

The main power plant in each of these boats consists of four 450 horsepower diesel engines, each direct connected to a 275-kilowatt 250-volt, shunt-wound, separately-excited, direct current generator. Each set has a 40-kilowatt, 125-volt, compound-wound auxiliary generator mounted on the main engine generator shaft. These generating sets operate at 230 revolutions per minute and the generators are connected in series so that they supply current at 1000 volts to the propeller motors, which are of double unit construction, shunt-wound, and separately excited.

The continuous duty rating of these motors is 1250 shaft horsepower at 100 to 130 revolutions per minute with 500 volts on each armature. Speed control of the propellers is effected through voltage control of the driving motor.

The two propeller motors are connected in series with each other and in series with the main generators. In accelerating the vessel, full torque is applied to each propeller for a short period, after which the stern propeller comes up to speed while the bow propeller is rotated at just sufficient speed to overcome its own resistance and compensate for friction.

Complete control of propulsion can be maintained from either of the pilot houses or the engine room, the control equipment being similar in appearance and as simple in operation as the conventional engineroom telegraph pedestal.

Equipment was under construction for an electrically-propelled packet boat designed to carry 250 tons of package freight at a speed of 12 miles per hour between New Brunswick, N. J., and points in and adjacent to the harbor of New York.

In this case, electric propulsion was selected primarily because the height of the engines could be kept down and thus allow a clear deck for package freight and on account of the ease with which this packet boat could be controlled in maneuvering in congested waterways.

The power plant will consist of two 250 horsepower, 300 revolutions per minute diesel engines driving direct-connected, main and auxiliary generators. The single propeller will operate at speeds up to 175 revolutions per minute, and the driving motor will develop 400 shaft horsepower.

Diesel Electric Freighters

A field hitherto untouched by diesel electric propulsion was opened by the decision of the United States shipping board to authorize the conversion of three cargo boats with this type of drive. The use of diesel electric equipment for these craft will permit the operation of the propellers at their most efficient speed and this, combined with certain contemplated changes in the hull, should give an increased speed of about one and one-half knots over what would be obtained by direct diesel engine drive.

The engine room equipment will comprise four direct current diesel engine driven generators, each provided with an auxiliary generator mounted on the same shaft as the main generator. The main propelling motor will be rated 4000 shaft horsepower, at 70 revolutions per minute. The control will be of the variable voltage type, utilizing dead-front panels, and all of the auxiliaries will be electrically driven. One of these equipments is now being constructed in our factory.

Another novel application of diesel electric drive was inaugurated by the bureau of Lighthouses of the United States department of commerce, by its decision to adopt this method of propulsion for three new lightships. The equipment for each ship will consist of four 75-kilowatt main generators and two 7½-kilowatt separately-driven auxiliary generators, the single propelling motor for each ship being rated 350 shaft horsepower at 300 revolutions per minute.

In this case, the propelling equipment will be utilized intermittently as the lightships when in service are at anchor most of the time. In severe weather, the propulsion equipment will be used to take the strain off the anchor chains and will, of course, be utilized for maintaining position in the event of the breaking of the moorings.

The new single geared type of electrically operated deck winch, in which the driving motor is designed so that a minimum accelerating torque is required on average loads, was installed on the new International Mercantile Marine liner CALIFORNIA. This is the first extensive application of these winches and is the result of their ability to give high tonnage rates with low power consumption.

Development of Electric Auxiliaries

The new 10,000 ton light cruisers for the United States navy impose severe limitations on the weight of both the main and auxiliary machinery in order to keep the tonnage of these ships within the limitations of the Washington treaty and at the same time permit them to carry the desired armament.

Work on twenty-four, 250-kilowatt, 10,000 revolutions per minute, geared turbine direct current generating sets is now under way, and the adoption of a geared connection between the high speed turbine and the generators has effected a marked reduction in weight as compared with standard equipment. These sets are for the operation of motor driven auxiliaries on the cruisers.

The use of electricity on shipboard has grown tremendously in a relatively few years and the General Electric Co. is proud to have been so prominently associated with the major developments of such apparatus.

Sales and Repairs

Chairman T. V. O'Connor of the United States shipping board has announced the following sales charter and reconditioning of government vessels:

AMERICAN BANKER, AMERICAN FARMER, AMERICAN SHIPPER, AMERICAN MERCHANT and AMERICAN TRADER, all vessels of the American Merchant line. The offer of J. H. Winchester & Co., managing operators of this line to charter the five steamers on a bare boat basis was rejected by the shipping board because the proposed agreement would not be to the best interests of the government.

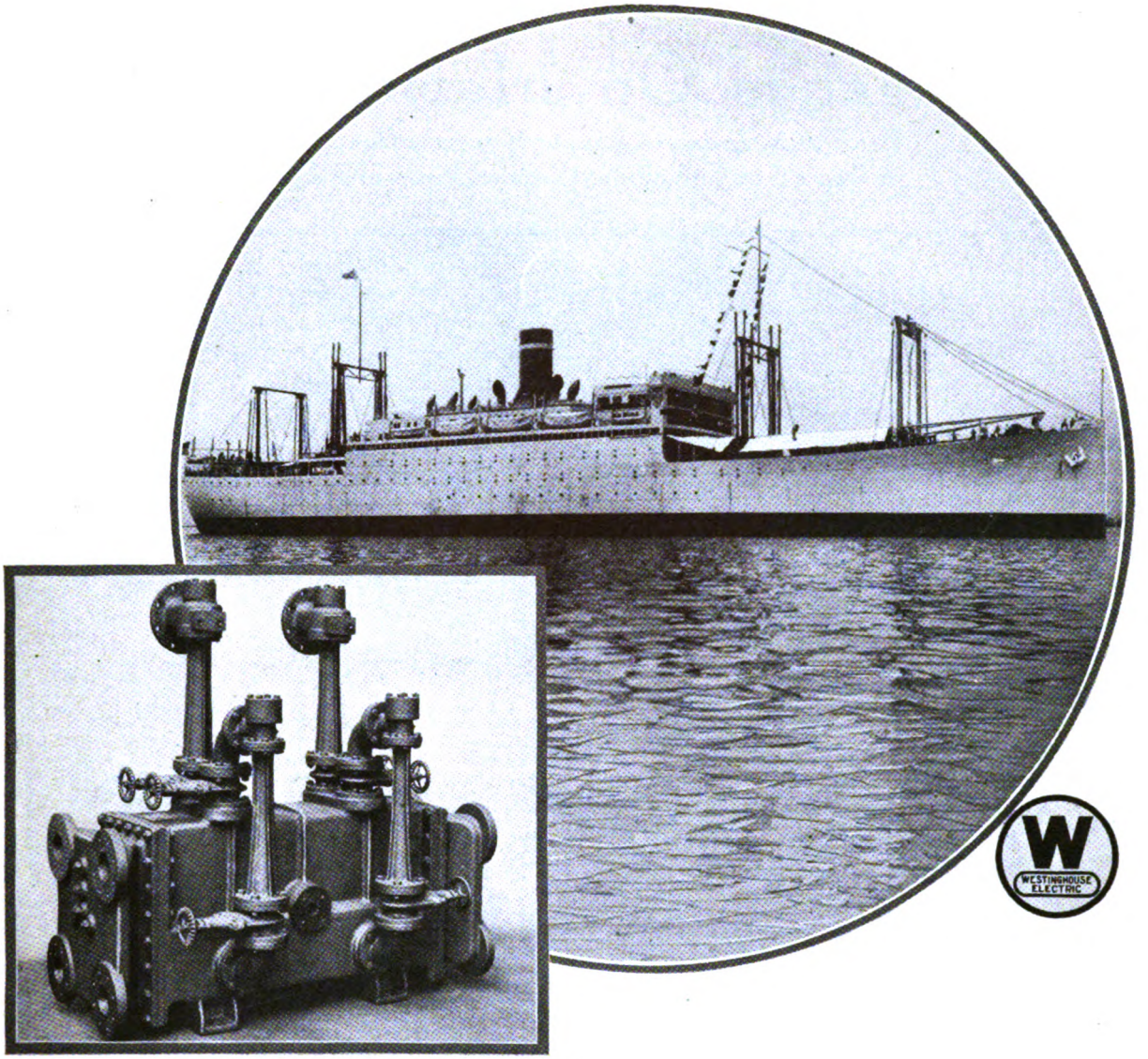
MARINERS HARBOR, a steel single screw, steam, cargo ship, burning coal, of 3535 deadweight tons, sold to R. W. Malone, Washington, D. C. for the sum of $43,000.

LEVIATHAN, famous passenger ship of the United States lines was to undergo her regular winter overhauling at the Boston navy yard, late in December. On Dec. 13 the board appropriated $180,440 for this work which was in addition to $108,000 previously appropriated. According to a statement from the board the work will include renewal of boiler and boiler tubes, general engine room maintenance, hull maintenance and general overhauling of the deck and steward's department.

PRESIDENT HARDING—The board authorized an expenditure of approximately $131,539 in connection with repairs and reconditioning on this vessel during her annual layup period between Dec. 23, and Feb. 3, 1928.

AMERICA—An expenditure not to exceed $75,000 was authorized by the board for the purchase of new equipment and certain items of reconditioning of staterooms etc., in the tourists first class and third class accommodations of this vessel.

WEST CAJOOT, operated in the American Australia Orient line between Pacific coast ports, Australia and New Zealand. The board authorized an expenditure of $60,000 on this vessel. She is to be ready to re-enter service at San Francisco on Jan. 18.



High Vacuum —*Economically*

WESTINGHOUSE developed and installed the first high vacuum steam jet air ejectors for removing air from marine condensers.

Marine engineers quickly recognized the desirability of this apparatus and today more than three hundred and fifty ships are equipped with Westinghouse air ejectors and condensing equipment.

Westinghouse manufactures condensers and their auxiliaries as well as prime movers for practically every service on land and sea. This broad experience places the company in an unequalled position to give advice on equipment for the specific application under consideration.

Westinghouse Electric & Manufacturing Company
South Philadelphia Works Philadelphia, Pa.
Sales Offices in All Principal Cities of
the United States and Foreign Countries

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Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

Name	Date	Nature	Place	Damage Resulting
Angus	Oct. 4	Collision	Coleraine Harbour	Stern
Atlantic	Oct. 6	Collision	Kiel Canal	Badly
Antinous	Oct. 6	Disabled	Dunkirk	Machinery
Advance	Nov. 3	Struck object	Cornwall Canal	Leaking
Avalon	Oct. 29	Collision	Off Boston	Sank
Arlyn	Nov. 3	Disabled	Not stated	Steering gear
Adelaide Day	Nov. 10	Fire	Not stated	Abandoned
Aizkarai Mendi	Oct. 19	Aground	Buenos Ayres	Floated
Audacity	Oct. 20	Collision	Ymuiden	Not stated
Aira	Oct. 25	Disabled	Yarmouth Harbour	Engine
Burgermeister Eschenburg	Oct. 7	Ashore	Newcombe	Not stated
Bay State	Oct. 29	Aground	St. Clair River	Floated
Birk	Oct. 12	Ashore	Old Providence Island	Floated
Bahrenfeld	Oct. 11	Collision	Nr. Blankenese	Considerable
Bratsberg	Oct. 20	Collision	Kiel	Not stated
Billwarder	Oct. 26	Ashore	Hafnir, South Coast	Total wreck
Birger Jarl	Oct. 27	Aground	Mariehamn	Not stated
Beechwood	Oct. 27	Collision	Off Pendeen	Bowsprit
Canopus	Oct. 14	Aground	Kelley Island shoal	Floated—forward
Cora F. Cressy	Oct. 13	Ashore	Searsport	Floated
Canadian Leader	Oct. 14	Ashore	Nr. Antwerp	Floated—engines
City of Victoria	Oct. 4	Ashore	So. of Osaka	Floated
Canadian Runner	Oct. 20	Collision	Rimouske	Ashore—floated
Coos Bay	Oct. 27	Ashore	San Francisco	Not stated
Charles Dick	Oct. 28	Struck dock	Wyandotte	Bow
Conneaut	Nov. 4	Aground	Off Wyandotte	Floated
Canada	Oct. 23	Explosion	Colon	Damaged
Clara M. Littlefield	Oct. 27	Stranded	So. of South Pass	Not stated
City of Omaha	Oct. 29	Disabled	Elbe River	Not stated
Chas. M. Struven	Nov. 9	Collision	New York	Damaged
Choule	Oct. 10	Collision	Black Sea	Above waterline
Canadian Leader	Oct. 14	Aground	Off Krankeloon	Floated—engines
Caterina B	Oct. 19	Ashore	Nr. Fort de France	Not stated
Cabo Blanco	Oct. 24	Collision	Barcelona	Stern
City of Joliet	Oct. 26	Struck bridge	Lake Charles	Damaged
Delaware	Oct. 3	Ashore	Galveston	Not stated
Davaar	Oct. 6	Aground	Nr. Pirnmill	Not stated
Domala	Oct. 6	Collision	River Humber	Not stated
Dorella	Oct. 6	Fire	Off Southwold	Total loss
Dromore Castle	Oct. 25	Collision	Point Breeze	Plates
De Grasse	Nov. 9	Collision	North River	Not stated
Den Haag	Oct. 24	Struck sub. object	Baton Rouge	Propeller
Dragon	Oct. 28	Ashore	Sand Island	Considerable
Elizabeth Bandi	Oct. 19	Disabled	Five Fathom Bank	Lost rudder
Eleanor Christensen	Oct. 21	Collision	San Francisco	Not stated
ElizabethFreeman	Oct. 24	Fire	St. Johns Inlet	Damaged
Elswick Park	Nov. 2	Collision	Off Marcus Hook	Rudder
Elmpark	Oct. 14	Ashore	Lee Point	Not stated
Edfou	Oct. 25	Collision	Glasgow	Plates; rails
Elbing II	Oct. 25	Aground	Hohenhorn	Floated
Eilbecktal	Oct. 26	Aground	Off Ramsgate	Not stated
Flowerdew	Oct. 16	Fire	East of Savannah	Abandoned
Favignana	Oct. 5	Collision	Eastham Chan.	Starboard side
Flotterston	Oct. 1	Aground	Riga	Bulwarks
Frank Billings	Nov. 4	Aground	Gull Island reef	Floated—plates
Forsete	Oct. 24	Disabled	Bear Island	Propeller shaft
Gertrud	Oct. 5	Collision	Eastham Channel	Stem
Galatea	Oct. 7	Collision	River Mersey	Port quarter
Georgia D. Jenkins	Nov. 4	Gale	East Penobscot Bay	Sank
Goosander	Oct. 7	Collision	Crosby Channel	Propeller
Gammal	Oct. 11	Sank	River Mersey	
Glensanda	Oct. 13	Aground	Punta Indio	Floated
Haiti	Oct. 21	Aground	Bordeaux	Floated
Hopeland	Oct. 27	Fire	Buenos Ayres	No. 2 hold
Iossifoglu	Oct. 14	Disabled	Yokohama	machinery
India	Nov. 3	Aground	Saginaw Bay	Floated
Isabo	Oct. 27	Ashore	Nr. Scilly Island	Total wreck
Inga	Oct. 25	Disabled	Copenhagen	Machinery
Juan Maragall	Oct. 4	Disabled	Cadiz	Tailshaft; lost propeller
Josephine Delmas	Oct. 13	Fire	Biloxi	Burned to water's edge
John A. Donaldson	Oct. 25	Collision	St. Clair River	Not stated
John Dunn, Jr.	Oct. 28	Struck bottom	Sandusky	Bottom
Jouett	Nov. 4	Ashore	Gloucester	Floated
John F. Bresnahan	Nov. 7	Sank	New York	
Johan	Oct. 12	Collision	Flushing	Badly
J. J. Lister	Oct. 24	Collision	Barcelona	Not stated
Kaiapoi	Oct. 6	Disabled	Hobart	Machinery
Katwijk	Oct. 20	Collision	Ymuiden	Sank
Kobe	Oct. 18	Ashore	Trutaeva Bank	Floated
Kaete Runne	Oct. 20	Collision	Kiel	Slight
Lake Farber	Oct. 11	Stranded	Nr. Carys Fort	Floated
Lancastria	Oct. 4	Collision	Off Chapman Light	Starboard side
Londoner	Oct. 2	Hvy. weather	North Sea	Considerable
Lulea	Oct. 11	Collision	Rotterdam	Bows
Lisco No. 2	Oct. 12	Stranded	New York	Considerable
Maurice R. Thurlow	Oct. 13	Fire	Norfolk	Abandoned
Munloyal	Oct. 14	Disabled	Mobile	Engine
Mindoro	Oct. 24	Collision	Port Huron	Sank
Metagama	Nov. 10	Fire	London	Considerable
Missaki Milli	Oct. 10	Collision	Black Sea	Not stated
Minera	Oct. 10	Collided wall	Buenos Ayres	Forward
Majfrid	Oct. 11	Aground	Trangsund Chan.	Leaking
Montferland	Oct. 20	Fire	Rio Janeiro	Not stated
Mexico Trader	Oct. 20	Hvy. weather	Mobile	Leaking—engines
Mergus	Oct. 21	Collision	Algiers	Not stated
Marta Schroeder	Oct. 26	Disabled	Emden	Machinery
Moncherie	Oct. 27	Collision	Off Pendeen	Not stated
Nattie	Oct. 13	Sank	Jersey City	
Norway	Oct. 17	Aground	Erie	Floated
Nile	Oct. 17	Ashore	London	Not stated
Newton Pine	Oct. 20	Collision	Rimouske	Damaged
Nil	Oct. 10	Ashore	Nr. Cape Vilano	Bottom
Nodzu	Oct. 11	Ashore	Breaksea Point	Not stated
New Lambton	Oct. 21	Collision	Algiers	Considerable
Nyassa	Oct. 27	Collision	Southampton	Damaged
Olympier	Oct. 3	Struck quay	Buenos Ayres	Bows
Operosita	Oct. 18	Aground	Off Cock Point	Floated
Providencia	Oct. 13	Ashore	Cape Elange	Floated
Point Breeze	Oct. 20	Disabled	Point Breeze	Machinery
Principessa Malfado	Oct. 25	Sank	Off Bahia	
Pere Marquette	Oct. 26	Fire	Manistee, Mich.	Total loss
Pequonnock	Nov. 9	Collision	North River	Considerable
Prestorant	Nov. 8	Ashore	Nr. Shanghai	Floated—forepeak
Pellerin De La Touche	Oct. 12	Aground	Bordeaux	Floated
Queen's County	Oct. 11	Collision	Rotterdam	Aground
Rusinga	Sept. 30	Fire	Musoma Port	Total loss
Roxen	Oct. 16	Disabled	San Francisco	Engine
Rosemount	Nov. 12	Sank	Welland Canal	
Runnelstone	Oct. 12	Aground	Nr. Quilleboeuf	Not stated
Rokos Vergottis	Oct. 21	Collided lock walls	Port Talbot	Bow
Sadie O'Boyle	Oct. 13	Sank	Jersey City	
Schodack	Oct. 13	Aground	Nr. Pauillac	Not stated
Sonja	Oct. 3	Ashore	Malo	Floated
Saga	Oct. 3	Aground	Millwall Dock	Floated
Sagama River	Oct. 6	Collision	River Humber	Badly
San Jacinto	Oct. 16	Fire	Key West	After hold
Sekstant	Oct. 24	Collision	Puerto Mexico	Plates
Santargsal	Oct. 28	Struck sub. object	Off Coast	Sank
San Juan	Oct. 22	Struck pier	San Francisco	Bow
Snetind	Nov. 5	Disabled	Off Hog Island	Foresail; steering gear
Sapporo Maru No. 1	Oct. 10	Gale	Maoka	Aground
Schodack	Oct. 13	Aground	Nr. Pauillac	Not stated
St. Hilda	Oct. 17	Collision	Tampico	Damaged
Sembilan	Oct. 18	Collision	Macassar	Damaged
Skude	Oct. 19	Stranded	Haugsholmen	Not stated
Sunoil	Oct. 22	Aground	Philadelphia	Floated
Sekiyo Maru	Oct. 20	Ashore	Iki Island	Not stated
Severn	Oct. 26	Collision	Nr. Bridgewater	Damaged
Thrushfield	Oct. 4	Collision	Coleraine Harbour	Bow
Tacoma	Oct. 21	Aground	Silver Island Pass	Floated
Tampa	Oct. 23	Disabled	Ponta Delgada	Machinery
Thor	Oct. 24	Aground	Kaiser Wilhelm Canal	Floated
Union	Oct. 19	Collision	Off Father Point	Plates
Ungava	Oct. 27	Wrecked	Labrador	
Vulcano	Oct. 19	Collision	Off Father Point	Sank
Victory	Oct. 19	Struck wreck	Not stated	Sank—raised
Virginia Pendleton	Oct. 20	Aground	Turks Island	Floated
Valleluce	Nov. 5	Ashore	Crane Island	Floated—slight
Vier Gebroeders	Oct. 12	Collision	Flushing	Sank
Vardefjell	Oct. 23	Ashore	Tyrhaug	Floated—leaking
Volturno	Oct. 26	Collision	Rotterdam	Slight
Wiconisco	Oct. 12	Gale	Off Newport	Sank
Winifred O'Donnell	Oct. 12	Ashore	Off Point Arguello	Floated
Wallingford	Oct. 15	Disabled	Off Coos Bay	Lost prop.
Wallasey	Oct. 7	Collision	River Mersey	Bows
W. H. Daniels	Oct. 29	Ashore	Hammond Point	Badly
Western Queen	Nov. 7	Struck wharf	Galveston	Stem
Wage	Oct. 24	Disabled	Klintehamn	Leaking
Yssel	Oct. 4	Collision	Nr. Elbe	Slight
Ziga Kapajtic	Oct. 20	Aground	Corfu	Not stated